

STATE OF TEXAS DEPARTMENT OF TRANSPORTATION



PLANS OF PROPOSED STATE HIGHWAY IMPROVEMENT

PROJECT NUMBER: F 2022(117)

**US 79
ROBERTSON COUNTY**

TOTAL LENGTH OF PROJECT = 3392 FT= 0.642 MILES

FOR THE CONSTRUCTION OF LEFT TURN LANE

FED. RD. DIV. NO. 6	PROJECT NUMBER F 2022(117)	HIGHWAY NUMBER US 79
STATE TEXAS	DISTRICT BRYAN	COUNTY ROBERTSON
CONTROL 0205	SECTION 02	JOB 067
		SHEET NO. 01

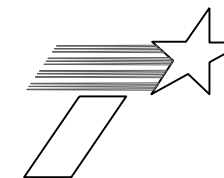
DESIGN SPEED: 70 MPH

SEE SHEET 2
FOR INDEX OF SHEETS
AND SHEET 3 FOR
PROJECT LOCATION MAP

FINAL PLANS

CONTRACTOR:
LETTING DATE:
DATE CONTRACTOR BEGAN WORK:
DATE WORK WAS COMPLETED:
DATE WORK WAS ACCEPTED:
FINAL CONTRACT COST: \$

LOCATION NO.	HIGHWAY	CONTROL NO.	LIMITS	2019/2039 ADT	REFERENCE MARKERS		TOTAL LENGTH (FT)	BRIDGE LENGTH (FT)	RDWY LENGTH (FT)
					BEGIN	END			
1	US 79	0205-02-067	AT FM 1940	5469/7110	RM 474+1.385 MI (12.366 MI)	RM 474+1.537 MI (12.518 MI)	3392	0	3392



TEXAS DEPARTMENT OF TRANSPORTATION®

SUBMITTED FOR LETTING: 9/1/2021
 DocuSigned by:

 DESIGN MANAGER

RECOMMENDED FOR LETTING: 9/2/2021
 DocuSigned by:

 DIRECTOR OF TRANSPORTATION
 PLANNING AND DEVELOPMENT

APPROVED FOR LETTING: 9/2/2021
 DocuSigned by:

 DISTRICT ENGINEER

NO EXCEPTIONS
NO EQUATIONS
NO RAILROAD CROSSINGS

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014, AND SPECIFICATION ITEMS LISTED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT:
 REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, MAY, 2012)

© 2021 By Texas Department of Transportation;
all rights reserved.

REV DATE: 2-12-2015
CSJ: XXX-XX-XXX
FILENAME: pwt\trdot\projectwiseonline.com\TxDOT\Documents\17 - BRY\Design Projects\02050206714 - Design\Plan Set\1 - General\1A - TitleSheet\Title Sheet

INDEX OF SHEETS

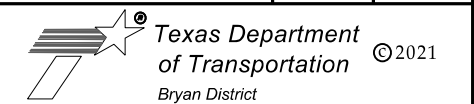
SHEET NO.	DESCRIPTION	SHEET NO.	DESCRIPTION
1	TITLE SHEET	56	SIGN DETAILS
2	INDEX OF SHEETS		
3	PROJECT LOCATION MAP	57-60	* PM (1)-20 THRU PM (4)-20
4	TYPICAL SECTIONS	61	* RS (3)-13
5-5D	GENERAL NOTES	62	* RS (4)-13
6-6A	ESTIMATE AND QUANTITY SHEET	63-65	* TSR (3)-13 THRU TSR (5)-13
7	SUMMARY OF QUANTITIES	66	* SMD (GEN)-08
8	SUMMARY OF SMALL SIGNS	67-69	* SMD (SLIP-1)-08 THRU SMD (SLIP-3)-08
9	SEQUENCE OF WORK	70-73	* D&OM(1)-20 THRU D&OM(4)-20
10-21	* BC (1)-21 THRU BC (12)-21	74	SW3P NARRATIVE
22	* TCP (1-1)-18	75-76	SW3P LAYOUT
23	* TCP (1-2)-18	77	EPIC
24	* TCP (1-3)-18	78-80	* EC (1)-16 THRU EC (3)-16
25	* TCP (2-1)-18	81-83	* EC (9)-16 1-3
26	* TCP (2-2)-18		
27	* TCP (2-3)-18		
28	* TCP (3-1)-13		
29	* TCP (3-3)-14		
30	* TCP (S-1)-08A		
31	* TCP (S-2)-08A		
32	* TCP (S-2C)-10		
33	* TCP (S-3)-08		
34	* WZ(BRK)-13		
35	* WZ(RS)-16		
36	* WZ(STPM)-13		
37	* WZ(TD)-17		
38	* WZ(UL)-13		
39-40	ROADWAY LAYOUT		
41	* TE(HMAC)-11		
42	* TREATMENT FOR VARIOUS EDGE CONDITIONS		
43	DRAINAGE PLAN AND PROFILE		
44	* SCC-MD		
45-46	* SCC 3&4		
47	* SCP-MD		
48	* SCP-3		
49-50	* SETB-CD		
51	* SETP-PD		
52	* PSET-RP		
53	* PSET-RR		
53A	* BOX CULVERT SUPPLEMENTAL		
54-55	SIGNING AND STRIPING LAYOUT		

THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ABOVE WITH (*), HAVE BEEN SELECTED BY ME, OR UNDER MY RESPONSIBLE SUPERVISION, AS BEING APPLICABLE TO THIS PROJECT.



Timothy Tyler Thomason
9/1/2021

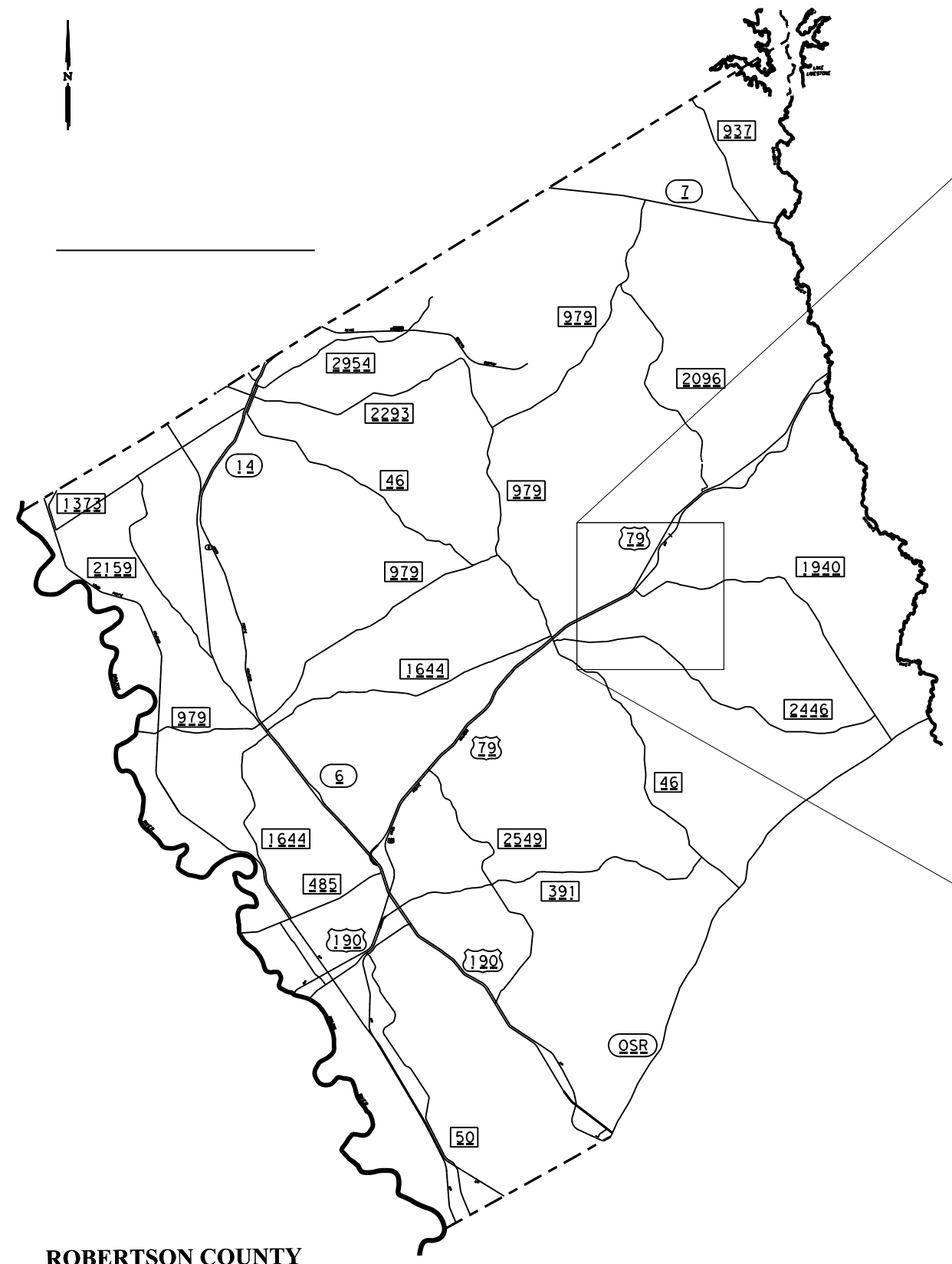
PRINT DATE	REVISION DATE
9/1/2021	



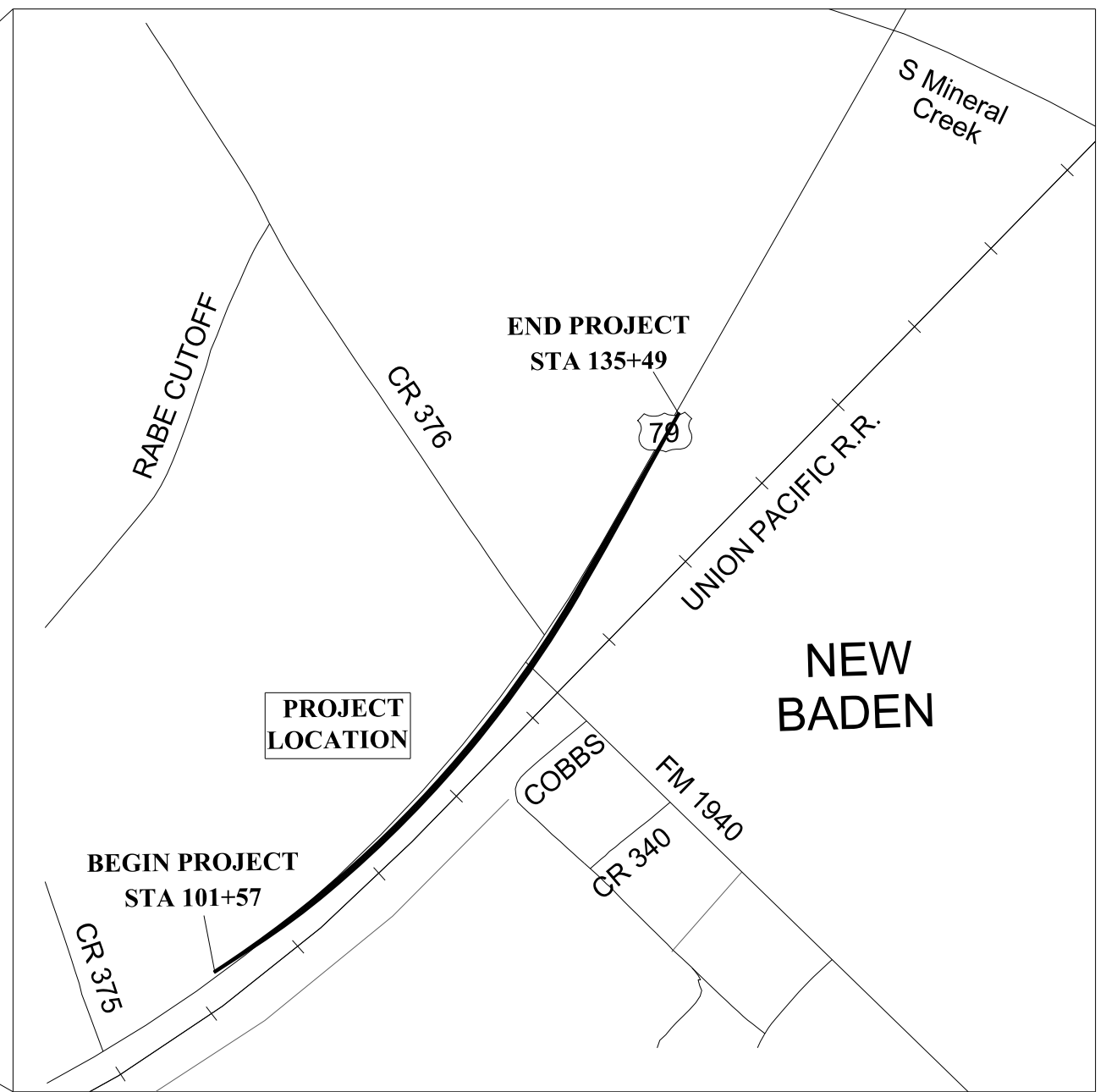
INDEX OF SHEETS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER	
6	F 2022(117)	US 79	
STATE	DISTRICT	COUNTY	
TEXAS	BRYAN	ROBERTSON	
CONTROL	SECTION	JOB	SHEET NO.
0205	02	067	02

REV DATE: 2-12-2015
 CSJ: XXXX-XX-XX
 FILENAME: p:\t\tdot\project\wiseonline.com\T\DOT4\Documents\17 - BRY\Design Projects\02050206714 - Design\Plan Set\1 - Project Layout\Project Location



ROBERTSON COUNTY



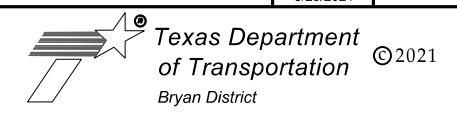
PROJECT LOCATION

BEGIN PROJECT
STA 101+57

END PROJECT
STA 135+49

NEW
BADEN

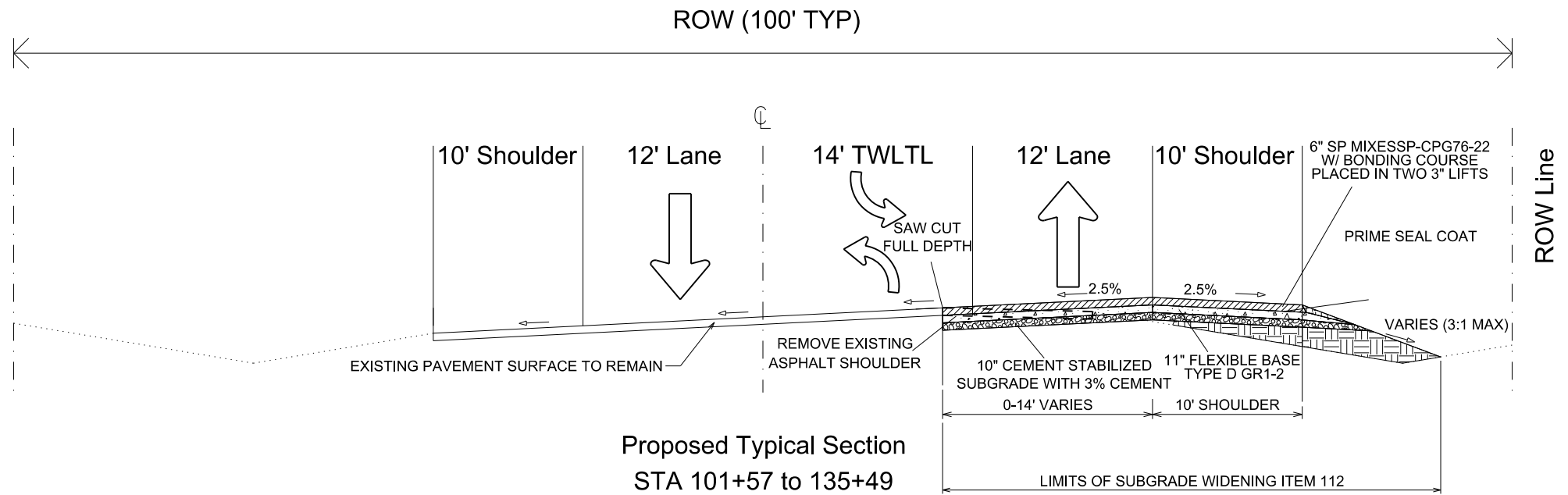
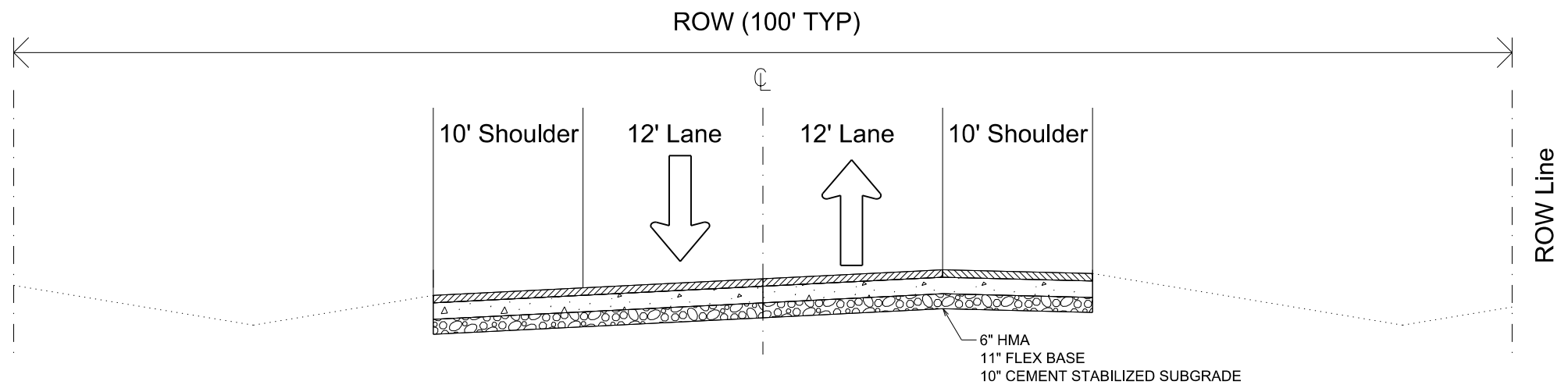
PRINT DATE	REVISION DATE
8/25/2021	



PROJECT LOCATION MAP

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER	
6	F 2022(117)	US 79	
STATE	DISTRICT	COUNTY	
TEXAS	BRYAN	ROBERTSON	
CONTROL	SECTION	JOB	SHEET NO.
0205	02	067	03

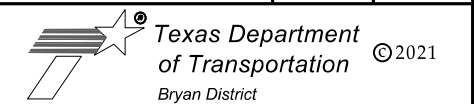
REV DATE: 2-12-2015
 CSJ: XXXX-XX-XXX
 FILENAME: p:\xroads\projectwiseonline.com\TXDOT\4\Documents\17 - BRY\Design Projects\02050206714 - Design\Plan Set\11 - Exist\Typical\Sections\Typical Sections



Timothy Tyler Thomason

8/25/2021

PRINT DATE	REVISION DATE
8/25/2021	



TYPICAL SECTIONS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER	
6	F 2022(117)	US 79	
STATE	DISTRICT	COUNTY	
TEXAS	BRYAN	ROBERTSON	
CONTROL	SECTION	JOB	SHEET NO.
0205	02	067	04

Highway: US 79
 County: Robertson

Sheet: 5
 Control: 0205-02-067

BASIS OF ESTIMATE					
ITEM	DESCRIPTION	COURSE	RATE	AMOUNT	QUANTITY
168	Vegetative Watering	-	10 GAL/SY	2058.4SY	20.6 MG
3084	Bonding Course	Tack Coat	0.10 GAL/SY	8068.5 SY	806.9 GAL
316	Asphalt (RC 250)	1 ST	0.25 GAL/SY	8068.5 SY	2017.1 GAL
316	Aggregate (TY-PB GR 4 or TY-PL GR-4 SAC-B)	1 ST	1 CY/135 SY	8068.5 SY	59.8 CY
3077	FGSM (AGGR) (TY II SMA) (SAC A)	1"	110 LB/SY	8065.5 SY	2662.6 TON

BASIS OF ESTIMATE				
* for contractor's information only				
ITEM	DESCRIPTION	RATE	AMOUNT	QUANTITY
166*	FERTILIZER **	60 LB/AC	1.3 AC	.04 TON (78 LB)

Note: Rates are for estimating purposes only. Actual Rates will be determined in the field.

** Tonnage represents Nitrogen content only.

GENERAL:

Contractor questions on this project are to be addressed to the following individuals:

Ashley Hill, P.E., A.E., Ashley.Hill@txdot.gov

Joseph Greive, P.E., A.A.E., Joseph.Greive@txdot.gov

Contractor questions will be accepted through email, phone, and in person by the above individuals.

All contractor questions will be reviewed by the Engineer. Once a response is developed, it will be posted to TxDOT's Public FTP at the following address:

<https://ftp.dot.state.tx.us/pub/txdot-info/Pre-Letting%20Responses/>

All questions submitted that generate a response will be posted through this site. The site is organized by District, Project Type (Construction or Maintenance), Letting Date, CCSJ/Project Name.

Send eligible shop plan submittals with PDF attachments directly to the reviewing office.

Sheet: 5
 Control: 0205-02-067

Highway: US 79
 County: Robertson

ITEM 5 "CONTROL OF THE WORK"

After letting, the Engineer will provide final earthwork construction cross-section data necessary for the contractor to establish and control the work.

When a precast or cast-in-place concrete element is included in the plans, a precast concrete alternate may be submitted in accordance with "Standard Operating Procedure for Alternate Precast Proposal Submission" found online at <https://www.txdot.gov/inside-txdot/forms-publications/consultants-contractors/publications/bridge.html#design>. Acceptance or denial of an alternate is at the sole discretion of the Engineer. Impacts to the project schedule and any additional costs resulting from the use of alternates are the sole responsibility of the Contractor.

If TCP 2-3 is utilized, maintain an 8' shoulder minimum outside the southbound lane of travel.

ITEM 7 "LEGAL RELATIONS AND RESPONSIBILITIES"

State contract mowers will mow the right of way during the growing season. The Contractor will be notified by the Engineer one week in advance of the anticipated time when mowers will be in the limits of the project. Clean the right of way to such a condition that allows the mowing contractors to safely mow.

This project is on a hurricane evacuation route. Furnish at the pre-construction meeting a written plan outlining procedures to suspend work, secure the job site and safely handle traffic through and across the project in the event of a hurricane evacuation.

During the hurricane season (June 1 through November 30), do not close any travel lanes except when the Contractor can demonstrate that he can provide labor, equipment, material, work plan, and quality of work to satisfactorily return all lanes to an open, all-weather travel surface within three days of receiving written or verbal notice but no later than 3 days prior to hurricane landfall. Construction of temporary lanes to an all-weather surface will be paid in accordance with Article 9.7, "Payment for Extra Work and Force Account Method".

In addition to lane closures, cease work 3 days prior to hurricane landfall on or near the roadway that adversely impacts the flow of traffic and reduces the capacity of the highway during an evacuation. Prohibit the Contractor's, sub-contractors' or material suppliers' vehicles from entering or exiting the stream of traffic including material hauling and delivery, and mobilization or demobilization of equipment. When directed, this prohibition will include a reasonable time period for the evacuees to return to their point of origin.

In the event of the declaration of a hurricane watch, warning, other severe weather warning or national or state emergency that requires the roadways in the vicinity be used as evacuation routes, cease all work that requires the Contractor's, sub-contractors' or material suppliers' vehicles to enter the stream of traffic on these primary or secondary evacuation routes. This work

Highway: US 79
County: Robertson

includes material hauling and delivery, and mobilization or demobilization of equipment. The following roadways are recognized evacuation routes in the Bryan District:

Primary Evacuation Routes: IH 45, US 290, SH 6, SH 36.

Secondary Evacuation Routes: US 79, US 84, SH 7, SH 30, SH 21, SH 105.

Other routes may be designated.

No significant traffic generator events identified.

ITEM 8 “PROSECUTION AND PROGRESS”

At the end of each work day, remove all grade differentials transverse to centerline.

At the end of each work day, provide 100 foot minimum grade tapers longitudinal to the centerline to transition differences in the profile grade line or roadway grade.

By noon of each Wednesday, provide the Engineer a written outline of the daily work schedule for the following week. Include in the outline the times and places for proposed traffic control changes, lane and shoulder closures, and moving operations or other operations that affect traffic on the roadway. Unless otherwise authorized by the Engineer, prosecute the work on this project in accordance with the following sequence of work:

1. Set advance signing and barricades
2. Place SW3P
3. Extend culvert at STA 128+00
4. For the section north of FM 1940:
5. Remove 10' of shoulder on the right side of the roadway
6. Widen the subgrade for the proposed width
7. Work the widening section
8. Cement treat the widening section a wait the necessary number of days to cure
9. Once subgrade has been treated and reaches density, place the Flex Base for the width of the widening
10. Once the Flex Base has reached density, apply the Prime Seal
11. Apply the Bonding Course across the full width of the widening
12. The same day, once adequate time for emulsion to break completely has passed, apply the first lift of asphalt in a single layer and reach the required density
13. Repeat steps 11 and 12 for the second lift of asphalt
14. Repeat steps 5-13 for the section south of FM 1940
15. Place seeding
16. Place new permanent pavement markings and signing
17. Remove SW3P once there is enough vegetation cover and the engineer approves
18. Final Cleanup

Highway: US 79
County: Robertson

Some of these operations may be performed simultaneously.

Equipment and material may be pre-staged at approved locations.

The 90-day delayed start allowed after authorization under SP008-003 is for Contractor time for material acquisition.

ITEM 100 “PREPARING RIGHT OF WAY”

During burn bans obtain written approval from the Commissioners Court prior to burning brush.

Prevent ashes from burned vegetation to be transported into any stream.

If burning is not allowed, all trees and brush will be disposed of by shredding, logging or other methods approved by the Engineer. Create a windrow, stockpile, or topdress biomass on disturbed areas along the project at locations approved by necessary permits and the Engineer.

ITEM 132 “EMBANKMENT”

Provide Embankment material for areas within the limits of the Pavement Structure that meet one of the following requirements:

- Sources outside the ROW provide material with a plasticity index between 10 and 25 and with less than 10% silt.
- Sources within the ROW provide material with a plasticity index between 10 and 25 and with less than 10% silt.

Provide Embankment material for areas outside the limits of the Pavement Structure with a plasticity index between 10 and 35.

ITEM 134 “BACKFILLING PAVEMENT EDGES”

Furnish Type A or B material meeting one of the following requirements:

Item 247, Type D Grade 3;

Reclaimed Asphalt Pavement (RAP) with 95% of the RAP passing the 2 inch sieve.

Place emulsified asphalt (SS-1, CSS-1, or as approved by the Engineer) at an application rate of 0.15 gal/SY.

Highway: US 79
County: Robertson

Sheet: 5B
Control: 0205-02-067

ITEM 160 “TOPSOIL”

All slopes requiring topsoil will be tracked immediately upon final grading to prevent erosion per standard sheet EC(1)-16. Tracking slopes to prevent erosion will not be measured or paid for directly, but will be subsidiary to pertinent Items.

Topsoil may be obtained from the right of way at sites of proposed excavation and embankment.

ITEM 166 “FERTILIZER”

Fertilize all areas of project that are being seeded or sodded.

ITEM 168 “VEGETATIVE WATERING”

Vegetative watering is required for all areas of the project that are being seeded or sodded.

ITEM 247 “FLEXIBLE BASE”

Place flexible base in equal lifts of 4 to 8 in. in depth unless otherwise approved by the Engineer.

ITEM 301 “ASPHALT ANTISTRIPPING AGENT”

When the Contractor adds lime as an anti-stripping agent (or an equivalent anti-stripping agent) the lime or equivalent shall be added to the asphaltic concrete in the methods specified in this item unless otherwise approved by the Engineer. If an alternate method is proposed, the Engineer’s approval will be based on test method Tex-242-F performed on the asphaltic concrete produced through the plant.

ITEM 316 “SEAL COAT”

Remove vegetation and blade pavement edges.

When placing surface treatment on base material, prepare surface by sweeping or other approved methods. Before applying bituminous material, lightly sprinkle the surface with water. When directed, sweep the surface after sprinkling with water. Do not apply bituminous material when water is puddling on the surface.

Sweep excess aggregate no sooner than 2 hours after rolling or as directed.

Highway: US 79
County: Robertson

Sheet: 5B
Control: 0205-02-067

Vehicles used to haul aggregate from the stockpile to the chip spreader will not be overloaded. Any damage to the roadway caused by the vehicles will be repaired by the Contractor at his expense and subsequent loads will be reduced so as not to cause further damage.

Transverse variance rates shall be used as directed. The nozzles outside the wheel paths will output up to 20% more asphalt by volume than the nozzles over the wheel paths.

The Contractor may be required to furnish and set string line to insure straight and uniform alignment as directed by the Engineer. The Contractor may use other methods subject to approval of the Engineer.

Surface treat driveways before the roadway is surface treated (second course only).

Cure surface treatments placed with a cutback asphalt binder for 21 days before placing subsequent surface courses unless otherwise directed by the engineer.

Air and surface temperature for asphalt material application will be in accordance with the specification and the manufacturer’s recommendation. However, the engineer may limit the use of an asphalt material due to the time of year.

ITEM 320 “EQUIPMENT FOR ASPHALT CONCRETE PAVEMENT”

Unless otherwise approved by the Engineer, provide a Material Transfer Device with remixing capabilities as specified in Item 320.2.3.3 Placement and Compaction Equipment for all asphaltic concrete pavement.

ITEM 464 “REINFORCED CONCRETE PIPE”

Seal joints using cold applied plastic asphalt sewer compound or cold applied preformed plastic gaskets. When cohesionless material is used for backfill, wrap the joints prior to backfilling with sand proof tape following the manufacturer's recommendations or with an equivalent material and method.

ITEM 467 “SAFETY END TREATMENTS”

All Type II SET’s shall have riprap aprons as shown on the plans. Riprap aprons are considered subsidiary to Type II SET’s.

Highway: US 79
County: Robertson

Sheet: 5C
Control: 0205-02-067

ITEM 502 “BARRICADES, SIGNS AND TRAFFIC HANDLING”

Where shown on applicable TCP standards, channelizing devices on the centerline are required at all times; including when a pilot vehicle is used to lead traffic. Mount a G20-4 sign at a conspicuous location on the rear of the vehicle. Traffic delays caused by one-lane, two-way traffic control, will not be allowed to exceed 5 minutes unless approved by the Engineer.

One way traffic control operations are required when placing centerline profile markings on all two-lane roadways, unless otherwise approved by the Engineer. Work area is limited to a maximum of 2 miles for this work.

During one-way operations, station flaggers at all county roads and any other locations, such as private businesses, that may have traffic entering the work area.

Prior to beginning pulverization operations, place an approved channelizing device along both sides of the travelway the entire length of the operation in accordance with the BC standards. Do not remove the channelizing devices until permanent edge striping is placed.

Removal of ground mounted temporary signs and supports as specified on standard sheet BC(5), shall include the immediate backfilling of support holes with Type B embankment material and the compaction of the backfill material.

The Contractor Force Account “Safety Contingency” that has been established for this project is intended to be utilized for work zone enhancements, to improve the effectiveness of the Traffic Control Plan, that could not be foreseen in the project planning and design stage. These enhancements will be mutually agreed upon by the Engineer and the Contractor’s Responsible Person based on weekly or more frequent traffic management reviews on the project. The Engineer may choose to use existing bid items if it does not slow the implementation of enhancement.

ITEM 533 “MILLED RUMBLE STRIPS”

For shoulders of 8’ to 10’ width, place the milled rumble strip a minimum of 3’ from the edgeline.

ITEM 644 “SMALL ROADSIDE SIGN ASSEMBLIES”

Salvage and deliver all aluminum sign faces to the local TxDOT maintenance office.

Highway: US 79
County: Robertson

Sheet: 5C
Control: 0205-02-067

ITEM 662 “WORK ZONE PAVEMENT MARKINGS”

Paint and beads may be used for non-removable work zone pavement markings.

All striping limits must be approved by the Engineer before striping operations may begin.

ITEM 666 “REFLECTORIZED PAVEMENT MARKINGS”

Unless authorized by the Engineer, the Contractor will not place the pavement markings on the resurfaced roadway until it has cured for 3 days.

All striping limits must be approved by the Engineer before striping operations may begin.

ITEM 672 “RAISED PAVEMENT MARKERS”

Use flexible bituminous adhesive for applications on all pavement types.

ITEM 3077 “SUPERPAVE MIXTURES”

Hamburg Wheel Test Requirements			
High-Temperature Binder Grade	Test Method	Laboratory Mixture Design or Trial Batch	Production and Placement Test¹
		Minimum # of Passes @ 0.5" Rut Depth, Tested @122°F	Minimum # of Passes @ 0.5" Rut Depth, Tested @122°F
PG 64 or lower	Tex-242-F	7,000	7,000

¹ The Engineer may accept if no more than 1 of the 5 most recent Hamburg Wheel tests is below the specified number of passes and the failing test is no more than 2,000 passes below the specified number of passes.

Add one (1.0) percent hydrated lime, commercial lime slurry, or an equivalent anti-stripping agent, based on the total aggregate weight, as mix enhancer for all mixture types unless otherwise approved by the Engineer. Provide hydrated lime or commercial lime slurry in accordance with DMS-6350, “Lime and Lime Slurry”. Add hydrated lime, commercial lime slurry, or an equivalent anti-stripping agent in accordance with Section 301.4.2.

Apply tack coat through a distributor spray bar in accordance with Section 316.3.1. Distributor. If residual from emulsion tack is not tacky, then the Engineer can require the use of PG binder.

RAS is not permitted in thin level-up courses.

Highway: US 79
County: Robertson

ITEM 6001 “PORTABLE CHANGEABLE MESSAGE SIGN”

Furnish, install, and operate up to 2 Portable Changeable Message Signs (PCMS) for this project. The signs can be used both on the project and within a ten (10) mile radius of the project. Locations, messages, and durations of use will be specified by the Engineer. The primary uses will be to inform the public of special events, lane and road closures, and changes in traffic control. Signs will be paid for only when used as directed by the Engineer.

ITEM 6185 “TRUCK MOUNTED ATTENUATOR (TMA) AND TRAILER ATTENUATOR (TA)”

In addition to the shadow vehicles with truck mounted attenuator (TMA) that are specified as being required on the traffic control plan (TCP) for this project,

provide 1 shadow vehicle(s) with TMA for TCP (1-1)-18 as detailed on General Note 4 of this standard sheet.

provide 1 shadow vehicle(s) with TMA for TCP (1-2)-18 as detailed on General Note 5 of this standard sheet.

provide 1 shadow vehicle(s) with TMA for TCP (1-3)-18 as detailed on General Note 6 of this standard sheet.

provide 1 shadow vehicle(s) with TMA for TCP (2-1)-18 as detailed on General Note 4 of this standard sheet.

provide 1 shadow vehicle(s) with TMA for TCP (2-2)-18 as detailed on General Note 6 of this standard sheet.

provide 1 shadow vehicle(s) with TMA for TCP (2-3)-18 as detailed on General Note 7 of this standard sheet.

provide 3 shadow vehicle(s) with TMA for TCP (3-1)-18 as detailed on General Note 3 of this standard sheet.

provide 3 shadow vehicle(s) with TMA for TCP (3-3)-18 as detailed on General Note 4 of this standard sheet.

Therefore, 12 total shadow vehicles with TMA will be required for this type of work. The contractor will be responsible for determining if one or more of these operations will be ongoing at the same time to determine the total number of TMAs needed for the project.

30 TMA days are provided in the project estimate for stationary operation.
4 TMA days are provided in the project estimate for mobile operations.



Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0205-02-067

DISTRICT Bryan
HIGHWAY US 79

COUNTY Robertson

CONTROL SECTION JOB				0205-02-067		TOTAL EST.	TOTAL FINAL
PROJECT ID				A00137286			
COUNTY				Robertson			
HIGHWAY				US 79			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL		
	100-6002	PREPARING ROW	STA	34.000		34.000	
	112-6002	SUBGRADE WIDENING (DENS CONT)	STA	34.000		34.000	
	132-6022	EMBANKMENT (VEHICLE)(DENS CONT)(TY C)	CY	1,398.000		1,398.000	
	134-6001	BACKFILL (TY A)	STA	34.000		34.000	
	160-6003	FURNISHING AND PLACING TOPSOIL (4")	SY	6,574.000		6,574.000	
	164-6003	BROADCAST SEED (PERM) (RURAL) (CLAY)	SY	6,574.000		6,574.000	
	164-6071	BROADCAST SEED (TEMP)(WARM OR COOL)	SY	6,574.000		6,574.000	
	168-6001	VEGETATIVE WATERING	MG	65.700		65.700	
	247-6292	FL BS (CMP IN PLACE)(TY D GR 1-2)(11")	SY	8,068.500		8,068.500	
	275-6001	CEMENT	TON	99.800		99.800	
	275-6006	CEMENT TREAT (EXIST MATL) (10")	SY	8,068.500		8,068.500	
	316-6029	ASPH (RC-250)	GAL	2,017.100		2,017.100	
	316-6403	AGGR (TY-B GR-5 OR TY-L GR-5)	CY	59.800		59.800	
	462-6046	CONC BOX CULV (3 FT X 3 FT)(EXTEND)	LF	14.000		14.000	
	464-6005	RC PIPE (CL III)(24 IN)	LF	170.000		170.000	
	467-6105	SET (TY I)(S=3 FT)(HW=3FT)(3:1)(C)	EA	1.000		1.000	
	467-6106	SET (TY I)(S=3 FT)(HW=3FT)(4:1)(C)	EA	1.000		1.000	
	467-6395	SET (TY II) (24 IN) (RCP) (6: 1) (P)	EA	8.000		8.000	
	496-6016	REMOV STR (PIPE)	EA	4.000		4.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	2.000		2.000	
	506-6002	ROCK FILTER DAMS (INSTALL) (TY 2)	LF	320.000		320.000	
	506-6011	ROCK FILTER DAMS (REMOVE)	LF	320.000		320.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	6,280.000		6,280.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	6,280.000		6,280.000	
	530-6006	DRIVEWAYS (SURF TREAT)	SY	245.000		245.000	
	533-6003	RUMBLE STRIPS (SHOULDER) ASPHALT	LF	3,272.000		3,272.000	
	533-6004	RUMBLE STRIPS (CENTERLINE) ASPHALT	LF	2,278.000		2,278.000	
	644-6001	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	EA	4.000		4.000	
	644-6004	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	EA	2.000		2.000	
	644-6006	IN SM RD SN SUP&AM TY10BWG(1)SA(T-EXAL)	EA	7.000		7.000	
	644-6076	REMOVE SM RD SN SUP&AM	EA	13.000		13.000	
	658-6060	REMOVE DELIN & OBJECT MARKER ASSMS	EA	2.000		2.000	
	658-6101	INSTL OM ASSM (OM-2Z)(WFLX)SRF)SRF	EA	2.000		2.000	
	662-6109	WK ZN PAV MRK SHT TERM (TAB)TY W	EA	336.000		336.000	
	662-6111	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	EA	462.000		462.000	
	666-6030	REFL PAV MRK TY I (W)8"(DOT)(100MIL)	LF	300.000		300.000	

DISTRICT	COUNTY	CCSJ	SHEET
Bryan	Robertson	0205-02-067	6



Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0205-02-067

DISTRICT Bryan
HIGHWAY US 79

COUNTY Robertson

CONTROL SECTION JOB				0205-02-067		TOTAL EST.	TOTAL FINAL
PROJECT ID				A00137286			
COUNTY				Robertson			
HIGHWAY				US 79			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL		
	666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	1,368.000		1,368.000	
	666-6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	14.000		14.000	
	666-6078	REFL PAV MRK TY I (W)(WORD)(100MIL)	EA	2.000		2.000	
	666-6300	RE PM W/RET REQ TY I (W)4"(BRK)(100MIL)	LF	1.000		1.000	
	666-6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	3,312.000		3,312.000	
	666-6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	9,214.000		9,214.000	
	668-6019	PREFAB PAV MRK TY B (W)(ARROW)	EA	4.000		4.000	
	672-6007	REFL PAV MRKR TY I-C	EA	53.000		53.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	546.000		546.000	
	672-6010	REFL PAV MRKR TY II-C-R	EA	1.000		1.000	
	677-6001	ELIM EXT PAV MRK & MRKS (4")	LF	4,232.000		4,232.000	
	3077-6032	SP MIXESSP-CPG76-22	TON	2,662.600		2,662.600	
	3084-6001	BONDING COURSE	GAL	1,613.700		1,613.700	
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	2.000		2.000	
	6185-6002	TMA (STATIONARY)	DAY	30.000		30.000	
	6185-6005	TMA (MOBILE OPERATION)	DAY	4.000		4.000	
18		LAW ENFORCEMENT: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000		1.000	
		SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	

Roadway Item Summary													
SHEET NUMBER	FROM STATION	TO STATION	100	112	132	134	247	275	275	316	316	3077	3084
			6002	6002	6006	6001	6292	6006	6001	6029	6403	6032	6001
			Prep ROW	SUBGRADE WIDENING (DENS CONT)	EMBANKMENT (VEH) (DENS CONT) (TY C)	BACKFILL (TY A)	FL BS (CMP IN PLACE) (TY D GR 1-2) (11")	CEMENT TREAT (EXIST MATL) (10")	CEMENT	ASPH (RC-250)	AGGR (TY-B GR-5 OR TY-L GR-5)	SP MIXESSP-CP G76-22	BONDING COURSE
			STA	STA	CY	STA	SY	SY	TON	GAL	CY	TON	GAL
1	101+57	112+30	10.7	10.7	375.6	10.7	2418.2	2418.2	29.9	604.6	17.9	798.0	483.6
1	112+30	125+20	13.1	13.1	478.3	13.1	3553.8	3553.8	44.0	888.5	26.3	1172.8	710.8
2	125+20	135+49	10.2	10.2	544.1	10.2	2096.5	2096.5	25.9	524.1	15.5	691.8	419.3
Project Totals			34	34	1398.0	34	8068.5	8068.5	99.8	2017.1	59.8	2662.6	1613.7

Drainage Item Summary			
SHEET NUMBER	462	467	
	6046	6105	6106
	CONC BOX CULV (3 FT X 3 FT)(EXTEND)	SET (TY I) (S=3 FT)(HW=3FT) (3:1)(C)	SET (TY I) (S=3 FT)(HW=3FT) (4:1)(C)
	LF	EA	EA
128+00	14	1	1
Project Totals	14	1	1

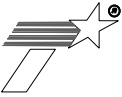
Driveway Item Summary							
ID	STATION	RT/LT	EXISTING SURFACE	530	464	467	496
				6006	6005	6395	6016
				DRIVEWAYS (SURF TREAT)	RC PIPE (CL III)(24 IN)	SET (TY II) (24 IN) (RCP) (6:1) (P)	REMOVE STR (PIPE)
				SY	LF	EA	EA
3-1	129+22	RT	GRAVEL	73	54	2	1
3-2	131+60	RT	GRAVEL	52	44	2	1
3-3	133+50	RT	GRAVEL	63	36	2	1
3-4	135+00	RT	GRAVEL	56	36	2	1
Project Totals				245	170	8	4

Summary of Signs					
SHEET NUMBER	ITEM 644			ITEM 658	
	6001	6004	6076	6060	6101
	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	IN SM RD SN SUP&AM TY10BWG(1)SA(T)	REMOVE SM RD SN SUP&AM	REMOVE DELIN & OBJECT MARKER ASSMS	INSTL OM ASSM (OM-2Z) (WFLX)GND
	EA	EA	EA	EA	EA
1	3	2	5		
2	1		1	2	2
Project Totals	4	2	6	2	2

Pavement Markings Summary																	
SHEET NUMBER	FROM STATION	TO STATION	ITEM 533		ITEM 666						ITEM 668	ITEM 672		ITEM 677		ITEM 662	
			6003	6004	6303	6315	6036	6030	6048	6078	6019	6007	6009	6001		6109	6111
			RUMBLE STRIPS (SHOULDER) ASPHALT	RUMBLE STRIPS (CENTERLINE) ASPHALT	REFL PM W/RET REQ TY 1		REFL PAV MRK TY 1				PREFAB PAV MRK	REFL PAV MRKR		ELIM EXT PAV MRK & MRKS (4")		WK ZN PAV MRK SHT TERM (TAB)TY W	WK ZN PAV MRK SHT TERM (TAB)TY Y-2
			LF	LF	(W) 4" (SLD) (100MIL)	(Y) 4" (SLD) (100MIL)	(W) 8" (SLD) (100MIL)	(W) 8" (DOT) (100MIL)	(W) 24" (SLD) (100MIL)	(W) WORD (100MIL)	TY B (W) ARROW	TY I-C	TY II-A-A	(W) 4" (SLD)	(Y) 4" SLD)	EA	EA
1	101+57	112+30	1074	646	1077	3484	278	150					546	544	544	118	174
1	112+30	125+20	1176	614	1214	2038	1020		14	2	4	27		786	786	112	102
2	125+20	135+49	1022	1018	1021	3692	70	150				26		786	786	106	186
Project Totals			3272	2278	3312	9214	1368	300.0	14.0	2.0	4	53.0	546.0	2116	2116	336	462

SW3P Summary of Quantities										
SHEET NUMBER	FROM STATION	TO STATION	ITEM 160	ITEM 164		ITEM 168	ITEM 506			
			6003	6003	6071	6001	6002	6011	6038	6039
			FURNISHING AND PLACING TOPSOIL (4")	BROADCAST SEED (PERM) (RURAL) (CLAY)	BROADCAST SEED (TEMP) (WARM OR COOL)	VEGETATIVE WATERING	ROCK FILTER DAMS (INSTALL) (TY 2)	ROCK FILTER DAMS (REMOVE)	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)
SY	SY	SY	MG	LF	LF	LF	LF			
1	101+57	112+30	2058.4	2058.4	2058.4	20.6	0	0	2140	2140
1	112+30	125+20	2130.9	2130.9	2130.9	21.3	80	80	2445	2445
2	125+20	135+49	2384.7	2384.7	2384.7	23.8	240	240	1695	1695
Project Totals			6574.0	6574.0	6574.0	65.7	320.0	320.0	6280	6280

PRINT DATE	REVISION DATE
8/25/2021	



Texas Department of Transportation ©2021
Bryan District

SUMMARY OF QUANTITIES

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER	
6	F 2022(117)	US 79	
STATE	DISTRICT	COUNTY	
TEXAS	BRYAN	ROBERTSON	
CONTROL	SECTION	JOB	SHEET NO.
0205	02	067	07

REV DATE: 2-12-2015
 CSJ: XXXX-XX-XXX
 FILENAME: p:\xtdot\project\online.com\T\DOT4\Documents\17 - BRY\Design Projects\02050206714 - Design\Plan Set\1 - General\1.G - Quantity\SummarySheets\Summary\Quantities

SUMMARY OF SMALL SIGNS

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: _____
 FILE: _____

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)				BRIDGE MOUNT CLEARANCE SIGNS (See Note 2)	
							POST TYPE	POSTS	ANCHOR TYPE	MOUNTING DESIGNATION		
										PREFABRICATED		1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels
							FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	1 or 2	UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	P = "Plain" T = "T" U = "U"	TY = TYPE TY N TY S	
1	1	D1-1L		84x12				1	SA	T		
1		M3-3		24x12								
1	4	M1-6F		24x24				1	SA	P		
1		M6-1		21x15								
1	5	R1-1		36x36				1	SA	P		
		D7-7aTR		48x48								
1	7	D7-7aTL		48x48				1	SA	T		
		M3-1		24x12								
1	8	M1-4		24x24				1	SA	P		
1	9	R2-1		30x36				1	SA	P		

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website:
<http://www.txdot.gov/>

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS) Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).



SUMMARY OF SMALL SIGNS

SOSS

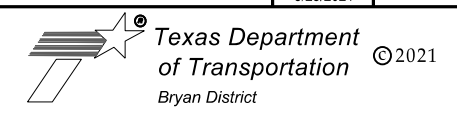
FILE: slums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT
© TxDOT May 1987	CONT	SECT	JOB	HIGHWAY
REVISIONS	0205	02	067	US 79
4-16	DIST	COUNTY	SHEET NO.	
8-16	BRY	ROBERTSON	08	

SEQUENCE OF WORK

1. Set advance signing and barricades
2. Place SW3P
3. Extend culvert at STA 128+00
4. For the section north of FM 1940:
5. Remove 10' of shoulder on the right side of the roadway
6. Widen the subgrade for the proposed width
7. Work the widening section
8. Cement treat the widening section a wait the necessary number of days to cure
9. Once subgade has been treated and reaches density, place the Flex Base for the width of the widening
10. Once the Flex Base has reached density, apply the Prime Seal
11. Apply the Bonding Course across the full width of the widening
12. The same day, once adequate time for emulsion to break completely has passed, apply the first lift of asphalt in a single layer and reach the required density
13. Repeat steps 11 and 12 for the second lift of asphalt
14. Repeat steps 5-13 for the section south of FM 1940
15. Place seeding
16. Place new permanent pavement markings and signing
17. Remove SW3P once there is enough vegetation cover and the engineer approves
18. Final Cleanup

REV DATE: 2-12-2015
 CSJ: XXXX-XX-XXX
 FILENAME: p:\t\tdot\project\wiseonline.com\T\DOT4\Documents\17 - BRY\Design Projects\02050206714 - Design\Plan Set\2, TCP\2A, TCP Sheets\SequenceOfWork

PRINT DATE	REVISION DATE
8/25/2021	



SEQUENCE OF WORK

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER	
6	F 2022(117)	US 79	
STATE	DISTRICT	COUNTY	
TEXAS	BRYAN	ROBERTSON	
CONTROL	SECTION	JOB	SHEET NO.
0205	02	067	09

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:
 FILE:

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

1. The Barricade and Construction Standard Sheets (BC sheets) are intended to show typical examples for placement of temporary traffic control devices, construction pavement markings, and typical work zone signs. The information contained in these sheets meet or exceed the requirements shown in the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
2. The development and design of the Traffic Control Plan (TCP) is the responsibility of the Engineer.
3. The Contractor may propose changes to the TCP that are signed and sealed by a licensed professional engineer for approval. The Engineer may develop, sign and seal Contractor proposed changes.
4. The Contractor is responsible for installing and maintaining the traffic control devices as shown in the plans. The Contractor may not move or change the approximate location of any device without the approval of the Engineer.
5. Geometric design of lane shifts and detours should, when possible, meet the applicable design criteria contained in manuals such as the American Association of State Highway and Transportation Officials (AASHTO), "A Policy on Geometric Design of Highways and Streets," the TxDOT "Roadway Design Manual" or engineering judgment.
6. When projects abut, the Engineer(s) may omit the END ROAD WORK, TRAFFIC FINES DOUBLE, and other advance warning signs if the signing would be redundant and the work areas appear continuous to the motorists. If the adjacent project is completed first, the Contractor shall erect the necessary warning signs as shown on these sheets, the TCP sheets or as directed by the Engineer. The BEGIN ROAD WORK NEXT X MILES sign shall be revised to show appropriate work zone distance.
7. The Engineer may require duplicate warning signs on the median side of divided highways where median width will permit and traffic volumes justify the signing.
8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.
9. The temporary traffic control devices shown in the illustrations of the BC sheets are examples. As necessary, the Engineer will determine the most appropriate traffic control devices to be used.
10. Where highway construction or maintenance work is being undertaken, other than mobile operations as defined by the Texas Manual on Uniform Traffic Control Devices, CSJ limit signs are required. CSJ limit signs are shown on BC(2). The OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits. For mobile operations, CSJ limit signs are not required.
11. Traffic control devices should be in place only while work is actually in progress or a definite need exists.
12. The Engineer has the final decision on the location of all traffic control devices.
13. Inactive equipment and work vehicles, including workers' private vehicles must be parked away from travel lanes. They should be as close to the right-of-way line as possible, or located behind a barrier or guardrail, or as approved by the Engineer.

WORKER SAFETY NOTES:


1. Workers on foot who are exposed to traffic or to construction equipment within the right-of-way shall wear high-visibility safety apparel meeting the requirements of ISEA "American National Standard for High-Visibility Apparel," or equivalent revisions, and labeled as ANSI 107-2004 standard performance for Class 2 or 3 risk exposure. Class 3 garments should be considered for high traffic volume work areas or night time work.
2. Except in emergency situations, flagger stations shall be illuminated when flagging is used at night.

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

1. Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources.
2. Work zone traffic control devices shall be compliant with the Manual for Assessing safety Hardware (MASH).

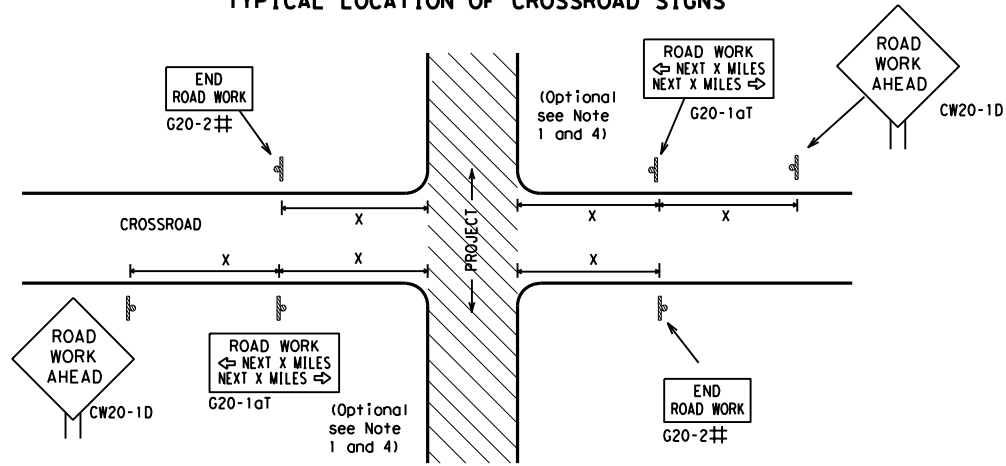
THE DOCUMENTS BELOW CAN BE FOUND ON-LINE AT http://www.txdot.gov
COMPLIANT WORK ZONE TRAFFIC CONTROL DEVICES LIST (CWZTCD)
DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS)
MATERIAL PRODUCER LIST (MPL)
ROADWAY DESIGN MANUAL - SEE "MANUALS (ONLINE MANUALS)"
STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS (SHSD)
TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD)
TRAFFIC ENGINEERING STANDARD SHEETS

SHEET 1 OF 12

 Texas Department of Transportation		Traffic Safety Division Standard	
BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS			
BC (1) - 21			
FILE:	bc-21.dgn	DN:	TxDOT
© TxDOT	November 2002	CK:	TxDOT
		DW:	TxDOT
		CK:	TxDOT
REVISIONS	CONT	SECT	JOB
4-03 7-13	0205	02	067
9-07 8-14			US 79
5-10 5-21	DIST	COUNTY	SHEET NO.
	BRY	ROBERTSON	10

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

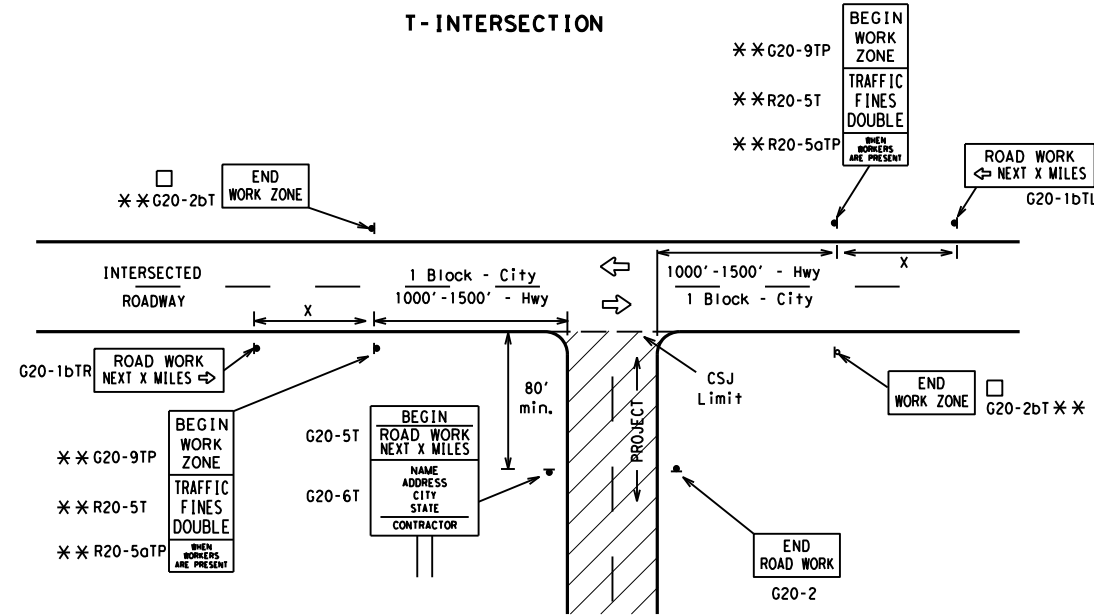
TYPICAL LOCATION OF CROSSROAD SIGNS



May be mounted on back of "ROAD WORK AHEAD" (CW20-1D) sign with approval of Engineer. (See note 2 below)

1. The typical minimum signing on a crossroad approach should be a "ROAD WORK AHEAD" (CW20-1D) sign and a (G20-2) "END ROAD WORK" sign, unless noted otherwise in plans.
2. The Engineer may use the reduced size 36" x 36" ROAD WORK AHEAD (CW20-1D) sign mounted back to back with the reduced size 36" x 18" "END ROAD WORK" (G20-2) sign on low volume crossroads (see Note 4 under "Typical Construction Warning Sign Size and Spacing"). See the "Standard Highway Sign Designs for Texas" manual for sign details. The Engineer may omit the advance warning signs on low volume crossroads. The Engineer will determine whether a road is low volume as per TMUTCD Part 5. This information shall be shown in the plans.
3. Based on existing field conditions, the Engineer/Inspector may require additional signs such as FLAGGER AHEAD, LOOSE GRAVEL, or other appropriate signs. When additional signs are required, these signs will be considered part of the minimum requirements. The Engineer/Inspector will determine the proper location and spacing of any sign not shown on the BC sheets, Traffic Control Plan sheets or the Work Zone Standard Sheets.
4. The "ROAD WORK NEXT X MILES" (G20-1aT) sign shall be required at high volume crossroads to advise motorists of the length of construction in either direction from the intersection. The Engineer will determine whether a roadway is considered high volume.
5. Additional traffic control devices may be shown elsewhere in the plans for higher volume crossroads.
6. When work occurs in the intersection area, appropriate traffic control devices, as shown elsewhere in the plans or as determined by the Engineer/Inspector, shall be in place.

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

1. The Engineer will determine the types and location of any additional traffic control devices, such as a flagger and accompanying signs, or other signs, that should be used when work is being performed at or near an intersection.
2. If construction closes the road at a T-intersection, the Contractor shall place the "CONTRACTOR NAME" (G20-6T) sign behind the Type 3 Barricades for the road closure (see BC(10) also). The "ROAD WORK NEXT X MILES" left arrow (G20-1bTL) and "ROAD WORK NEXT X MILES" right arrow (G20-1bTR) signs shall be replaced by the detour signing called for in the plans.

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING^{1,5,6}

Sign Number or Series	SIZE		SPACING	
	Conventional Road	Expressway/Freeway	Posted Speed MPH	Sign Δ Spacing "x" Feet (Apprx.)
CW20 ⁴	48" x 48"	48" x 48"	30	120
CW21			35	160
CW22			40	240
CW23			45	320
CW25			50	400
CW1, CW2, CW7, CW8, CW9, CW11, CW14	48" x 48"	48" x 48"	55	500 ²
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12			60	600 ²
			65	700 ²
			70	800 ²
			75	900 ²
			80	1000 ²
			*	* ³

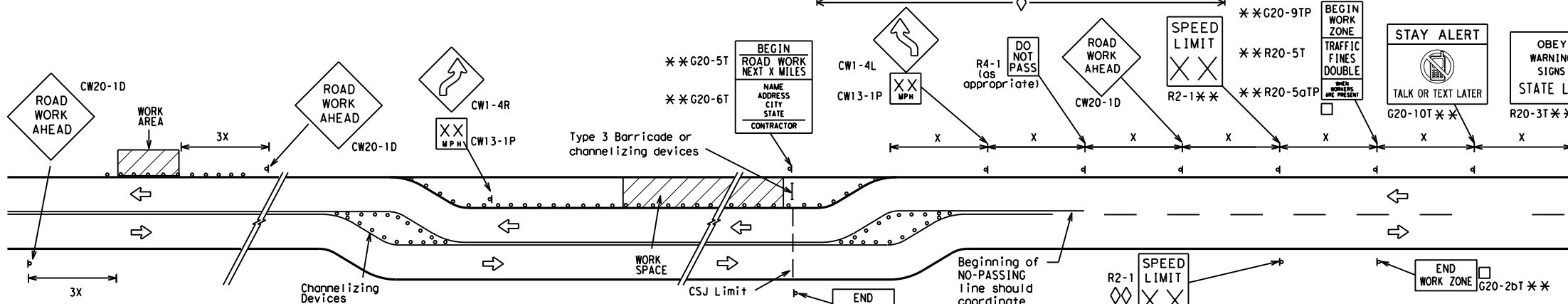
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

Δ Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

GENERAL NOTES

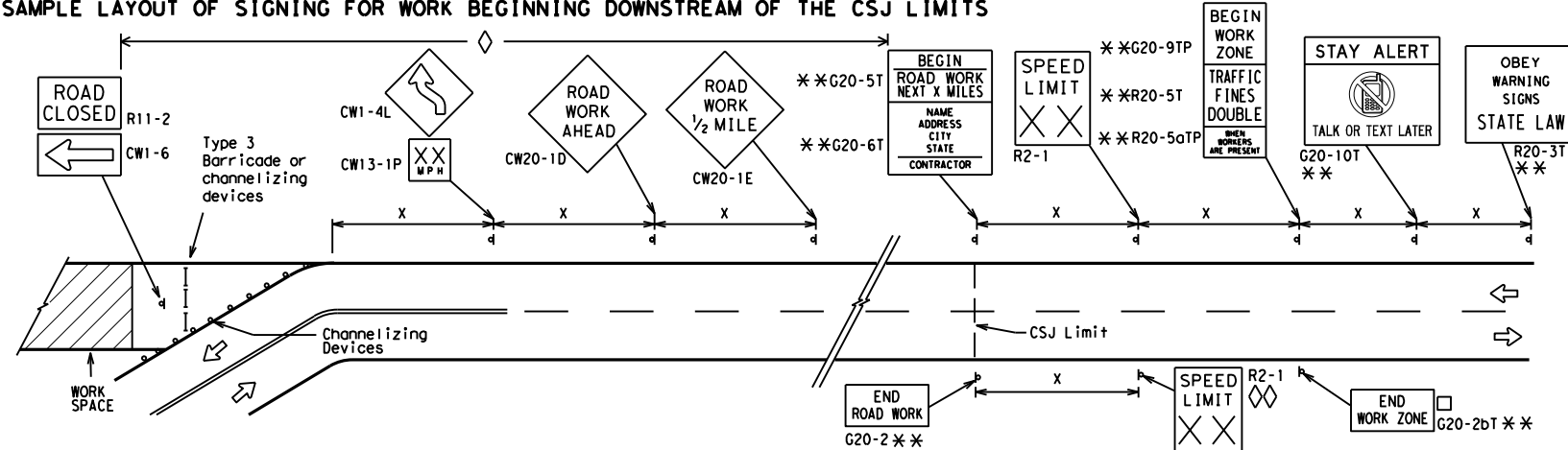
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D) signs may be used on low volume crossroads at the discretion of the Engineer as per TMUTCD Part 5. See Note 2 under "Typical Location of Crossroad Signs".
5. Only diamond shaped warning sign sizes are indicated.
6. See sign size listing in "TMUTCD", Sign Appendix or the "Standard Highway Sign Designs for Texas" manual for complete list of available sign design sizes.

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD" (CW20-1D) signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing of signs and channelizing devices.

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING DOWNSTREAM OF THE CSJ LIMITS



NOTES

- The Contractor shall determine the appropriate distance to be placed on the G20-1 series signs and "BEGIN ROAD WORK NEXT X MILES" (G20-5T) sign for each specific project. This distance shall replace the "x" and shall be rounded to the nearest whole mile with the approval of the Engineer. No decimals shall be used.
- The "BEGIN WORK ZONE" (G20-9TP) and "END WORK ZONE" (G20-2bT) shall be used as shown on the sample layout when advance signs are required outside the CSJ Limits. They inform the motorist of entering or leaving a part of the work zone lying outside the CSJ Limits where traffic fines may double if workers are present.
 - ** CSJ limit signing is required for highway construction and maintenance work, with the exception of mobile operations.
 - ◇ Area for placement of "ROAD WORK AHEAD" (CW20-1D) sign and other signs or devices as called for on the Traffic Control Plan.
 - ◇◇ Contractor will install a regulatory speed limit sign at the end of the work zone.

LEGEND	
—	Type 3 Barricade
○ ○ ○	Channelizing Devices
■	Sign
X	See Typical Construction Warning Sign Size and Spacing chart or the TMUTCD for sign spacing requirements.

SHEET 2 OF 12



BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

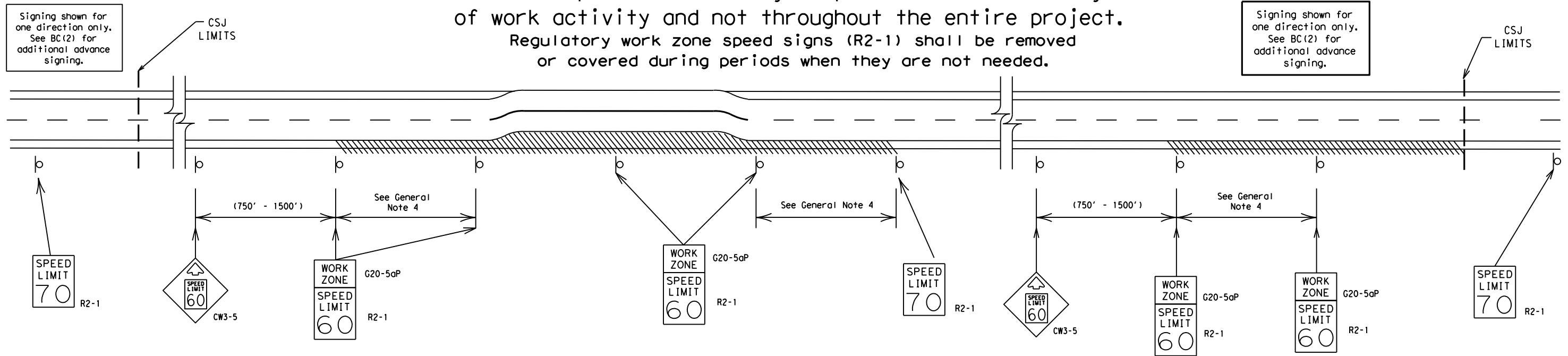
FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0205	02	067	US 79
9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	BRY	ROBERTSON	11	

DATE: FILE:

TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

Work zone speed limits shall be regulatory, established in accordance with the "Procedures for Establishing Speed Zones," and approved by the Texas Transportation Commission, or by City Ordinance when within Incorporated City Limits.

Reduced speeds should only be posted in the vicinity of work activity and not throughout the entire project. Regulatory work zone speed signs (R2-1) shall be removed or covered during periods when they are not needed.



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

This type of work zone speed limit should be included on the design of the traffic control plans when restricted geometrics with a lower design speed are present in the work zone and modification of the geometrics to a higher design speed is not feasible.

Long/Intermediate Term Work Zone Speed Limit signs, when approved as described above, should be posted and visible to the motorist when work activity is present. Work activity may also be defined as a change in the roadway that requires a reduced speed for motorists to safely negotiate the work area, including:

- rough road or damaged pavement surface
- substantial alteration of roadway geometrics (diversions)
- construction detours
- grade
- width
- other conditions readily apparent to the driver

As long as any of these conditions exist, the work zone speed limit signs should remain in place.

SHORT TERM WORK ZONE SPEED LIMITS

This type of work zone speed limit may be included on the design of the traffic control plans when workers or equipment are not behind concrete barrier, when work activity is within 10 feet of the traveled way or actually in the traveled way.

Short Term Work Zone Speed Limit signs should be posted and visible to the motorists only when work activity is present. When work activity is not present, signs shall be removed or covered. (See Removing or Covering on BC(4)).

GENERAL NOTES

- Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
- Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
- Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
- Frequency of work zone speed limit signs should be:

40 mph and greater	0.2 to 2 miles
35 mph and less	0.2 to 1 mile
- Regulatory speed limit signs shall have black legend and border on a white reflective background (See "Reflective Sheeting" on BC(4)).
- Fabrication, erection and maintenance of the "ADVANCE SPEED LIMIT" (CW3-5) sign, "WORK ZONE" (G20-5aP) plaque and the "SPEED LIMIT" (R2-1) signs shall not be paid for directly, but shall be considered subsidiary to Item 502.
- Turning signs from view, laying signs over or down will not be allowed, unless as otherwise noted under "REMOVING OR COVERING" on BC(4).
- Techniques that may help reduce traffic speeds include but are not limited to:
 - Law enforcement.
 - Flagger stationed next to sign.
 - Portable changeable message sign (PCMS).
 - Low-power (drone) radar transmitter.
 - Speed monitor trailers or signs.
- Speeds shown on details above are for illustration only. Work Zone Speed Limits should only be posted as approved for each project.
- For more specific guidance concerning the type of work, work zone conditions and factors impacting allowable regulatory construction speed zone reduction see TxDOT form #1204 in the TxDOT e-form system.

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:
FILE:

SHEET 3 OF 12



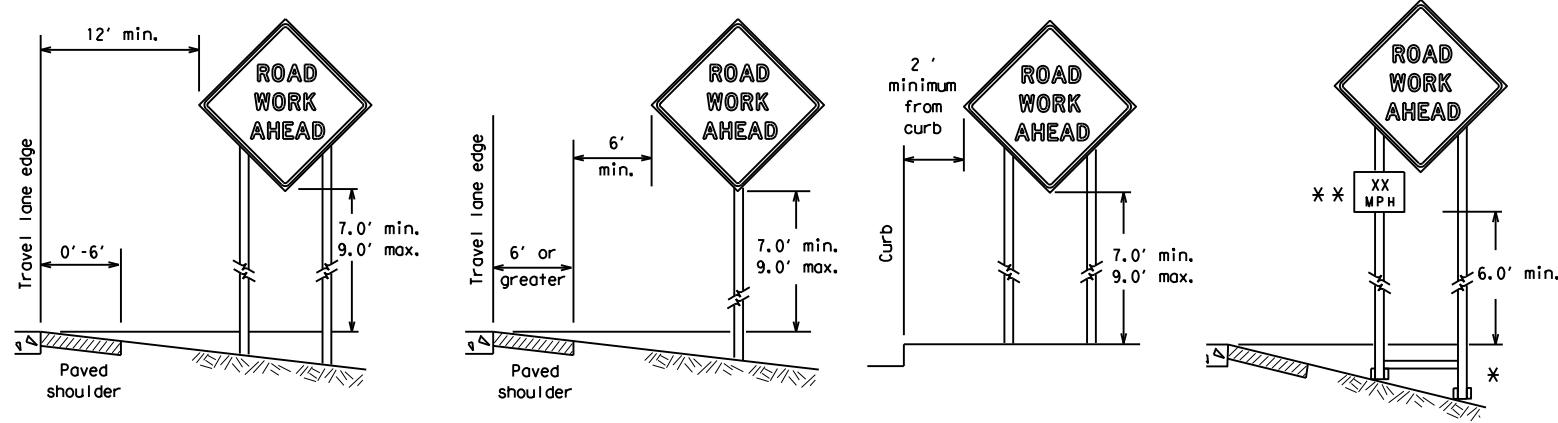
BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC (3) - 21

FILE:	bc-21.dgn	DW:	TxDOT	CK:	TxDOT	DW:	TxDOT	CK:	TxDOT
© TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY				
REVISIONS		0205	02	067	US 79				
9-07	8-14								
7-13	5-21	DIST	COUNTY		SHEET NO.				
		BRY	ROBERTSON		12				

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

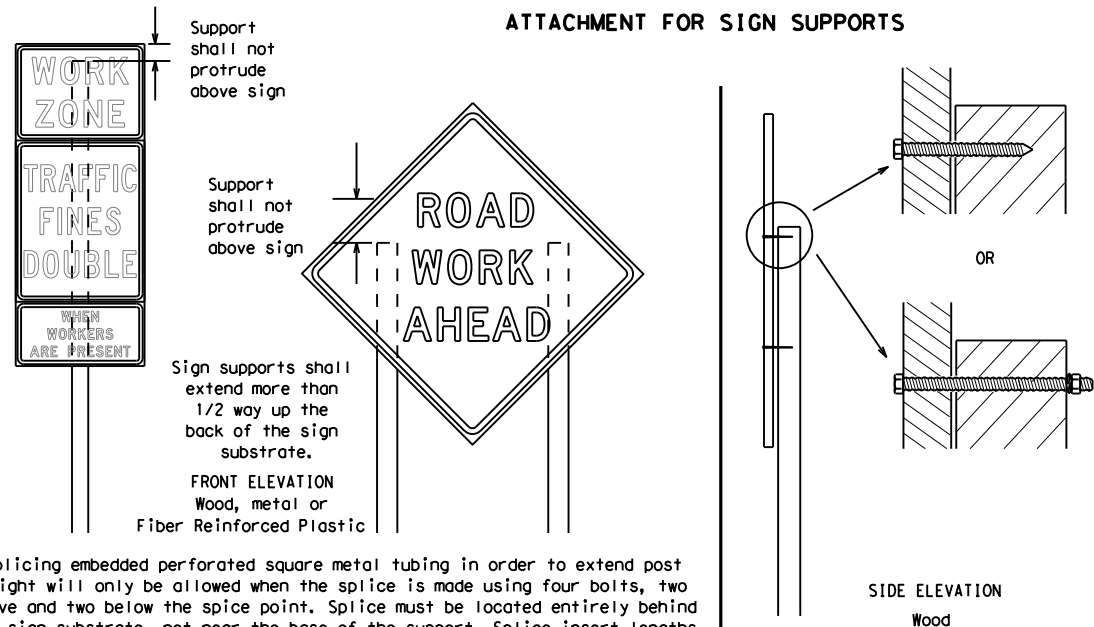
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

** When plaques are placed on dual-leg supports, they should be attached to the upright nearest the travel lane. Supplemental plaques (advisory or distance) should not cover the surface of the parent sign.

ATTACHMENT FOR SIGN SUPPORTS



Splicing embedded perforated square metal tubing in order to extend post height will only be allowed when the splice is made using four bolts, two above and two below the splice point. Splice must be located entirely behind the sign substrate, not near the base of the support. Splice insert lengths should be at least 5 times nominal post size, centered on the splice and of at least the same gauge material.

GENERAL NOTES FOR WORK ZONE SIGNS

- Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
- Wooden sign posts shall be painted white.
- Barricades shall NOT be used as sign supports.
- All signs shall be installed in accordance with the plans or as directed by the Engineer. Signs shall be used to regulate, warn, and guide the traveling public safely through the work zone.
- The Contractor may furnish either the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD). The Engineer/Inspector may require the Contractor to furnish other work zone signs that are shown in the TMUTCD but may have been omitted from the plans. Any variation in the plans shall be documented by written agreement between the Engineer and the Contractor's Responsible Person. All changes must be documented in writing before being implemented. This can include documenting the changes in the Inspector's TxDOT diary and having both the Inspector and Contractor initial and date the agreed upon changes.
- The Contractor shall furnish sign supports listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD) for small roadside signs. Supports for temporary large roadside signs shall meet the requirements detailed on the Temporary Large Roadside Signs (TLRS) standard sheets. The Contractor shall install the sign support in accordance with the manufacturer's recommendations. If there is a question regarding installation procedures, the Contractor shall furnish the Engineer a copy of the manufacturer's installation recommendations so the Engineer can verify the correct procedures are being followed.
- The Contractor is responsible for installing signs on approved supports and replacing signs with damaged or cracked substrates and/or damaged or marred reflective sheeting as directed by the Engineer/Inspector.
- Identification markings may be shown only on the back of the sign substrate. The maximum height of letters and/or company logos used for identification shall be 1 inch.
- The Contractor shall replace damaged wood posts. New or damaged wood sign posts shall not be spliced.

DURATION OF WORK (as defined by the "Texas Manual on Uniform Traffic Control Devices" Part 6)

- The types of sign supports, sign mounting height, the size of signs, and the type of sign substrates can vary based on the type of work being performed. The Engineer is responsible for selecting the appropriate size sign for the type of work being performed. The Contractor is responsible for ensuring the sign support, sign mounting height and substrate meets manufacturer's recommendations in regard to crashworthiness and duration of work requirements.
 - Long-term stationary - work that occupies a location more than 3 days.
 - Intermediate-term stationary - work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than one hour.
 - Short-term stationary - daytime work that occupies a location for more than 1 hour in a single daylight period.
 - Short, duration - work that occupies a location up to 1 hour.
 - Mobile - work that moves continuously or intermittently (stopping for up to approximately 15 minutes.)

SIGN MOUNTING HEIGHT

- The bottom of Long-term/Intermediate-term signs shall be at least 7 feet, but not more than 9 feet, above the paved surface, except as shown for supplemental plaques mounted below other signs.
- The bottom of Short-term/Short Duration signs shall be a minimum of 1 foot above the pavement surface but no more than 2 feet above the ground.
- Long-term/Intermediate-term Signs may be used in lieu of Short-term/Short Duration signing.
- Short-term/Short Duration signs shall be used only during daylight and shall be removed at the end of the workday or raised to appropriate Long-term/Intermediate sign height.
- Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

SIZE OF SIGNS

- The Contractor shall furnish the sign sizes shown on BC (2) unless otherwise shown in the plans or as directed by the Engineer.

SIGN SUBSTRATES

- The Contractor shall ensure the sign substrate is installed in accordance with the manufacturer's recommendations for the type of sign support that is being used. The CWZTCD lists each substrate that can be used on the different types and models of sign supports.
- "Mesh" type materials are NOT an approved sign substrate, regardless of the tightness of the weave.
- All wooden individual sign panels fabricated from 2 or more pieces shall have one or more plywood cleat, 1/2" thick by 6" wide, fastened to the back of the sign and extending fully across the sign. The cleat shall be attached to the back of the sign using wood screws that do not penetrate the face of the sign panel. The screws shall be placed on both sides of the splice and spaced at 6" centers. The Engineer may approve other methods of splicing the sign face.

REFLECTIVE SHEETING

- All signs shall be retroreflective and constructed of sheeting meeting the color and retro-reflectivity requirements of DMS-8300 for rigid signs or DMS-8310 for roll-up signs. The web address for DMS specifications is shown on BC(1).
- White sheeting, meeting the requirements of DMS-8300 Type A, shall be used for signs with a white background.
- Orange sheeting, meeting the requirements of DMS-8300 Type B_{FL} or Type C_{FL}, shall be used for rigid signs with orange backgrounds.

SIGN LETTERS

- All sign letters and numbers shall be clear, and open rounded type uppercase alphabet letters as approved by the Federal Highway Administration (FHWA) and as published in the "Standard Highway Sign Design for Texas" manual. Signs, letters and numbers shall be of first class workmanship in accordance with Department Standards and Specifications.

REMOVING OR COVERING

- When sign messages may be confusing or do not apply, the signs shall be removed or completely covered.
- Long-term stationary or intermediate stationary signs installed on square metal tubing may be turned away from traffic 90 degrees when the sign message is not applicable. This technique may not be used for signs installed in the median of divided highways or near any intersections where the sign may be seen from approaching traffic.
- Signs installed on wooden skids shall not be turned at 90 degree angles to the roadway. These signs should be removed or completely covered when not required.
- When signs are covered, the material used shall be opaque, such as heavy mil black plastic, or other materials which will cover the entire sign face and maintain their opaque properties under automobile headlights at night, without damaging the sign sheeting.
- Burlap shall NOT be used to cover signs.
- Duct tape or other adhesive material shall NOT be affixed to a sign face.
- Signs and anchor stubs shall be removed and holes backfilled upon completion of work.

SIGN SUPPORT WEIGHTS

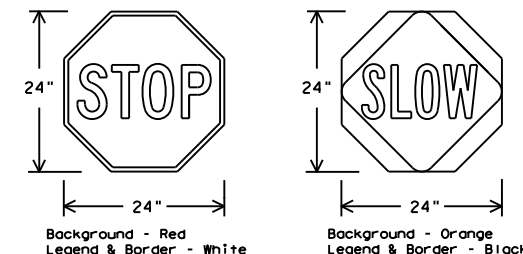
- Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand should be used.
- The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
- Rock, concrete, iron, steel or other solid objects shall not be permitted for use as sign support weights.
- Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs.
- Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall NOT be used.
- Rubber ballasts designed for channelizing devices should not be used for ballast on portable sign supports. Sign supports designed and manufactured with rubber bases may be used when shown on the CWZTCD list.
- Sandbags shall only be placed along or laid over the base supports of the traffic control device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners. Sandbags shall be placed along the length of the skids to weigh down the sign support.
- Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

FLAGS ON SIGNS

- Flags may be used to draw attention to warning signs. When used, the flag shall be 16 inches square or larger and shall be orange or fluorescent red-orange in color. Flags shall not be allowed to cover any portion of the sign face.

STOP/SLOW PADDLES

- STOP/SLOW paddles are the primary method to control traffic by flaggers. The STOP/SLOW paddle size should be 24" x 24".
- STOP/SLOW paddles shall be retroreflective when used at night.
- STOP/SLOW paddles may be attached to a staff with a minimum length of 6' to the bottom of the sign.
- Any lights incorporated into the STOP or SLOW paddle faces shall only be as specifically described in Section 6E.03 Hand Signaling Devices in the TMUTCD.



SHEETING REQUIREMENTS (WHEN USED AT NIGHT)		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	ORANGE	TYPE B _{FL} OR C _{FL} SHEETING
LEGEND & BORDER	WHITE	TYPE B OR C SHEETING
LEGEND & BORDER	BLACK	ACRYLIC NON-REFLECTIVE FILM

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

- Permanent signs are used to give notice of traffic laws or regulations, call attention to conditions that are potentially hazardous to traffic operations, show route designations, destinations, directions, distances, services, points of interest, and other geographical, recreational, specific service (LOGO), or cultural information. Drivers proceeding through a work zone need the same, if not better route guidance as normally installed on a roadway without construction.
- When permanent regulatory or warning signs conflict with work zone conditions, remove or cover the permanent signs until the permanent sign message matches the roadway condition. For details for covering large guide signs see the TS-CD standard.
- When existing permanent signs are moved and relocated due to construction purposes, they shall be visible to motorists at all times.
- If existing signs are to be relocated on their original supports, they shall be installed on crashworthy bases as shown on the SMD Standard sheets. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards. This work should be paid for under the appropriate pay item for relocating existing signs.
- If permanent signs are to be removed and relocated using temporary supports, the Contractor shall use crashworthy supports as shown on the BC standard sheets, TLRS standard sheets or the CWZTCD list. The signs shall meet the required mounting heights shown on the BC, or the SMD standard sheets during construction. This work should be paid for under the appropriate pay item for relocating existing signs.
- Any sign or traffic control device that is struck or damaged by the Contractor or his/her construction equipment shall be replaced as soon as possible by the Contractor to ensure proper guidance for the motorists. This will be subsidiary to Item 502.

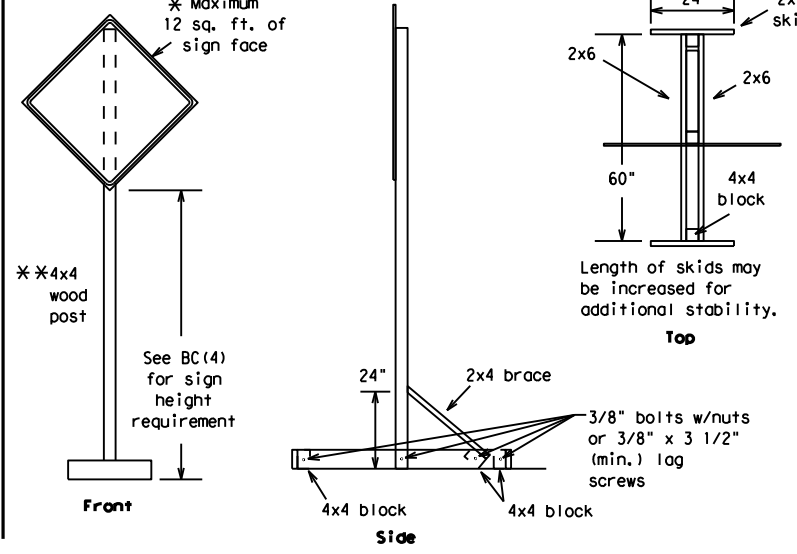
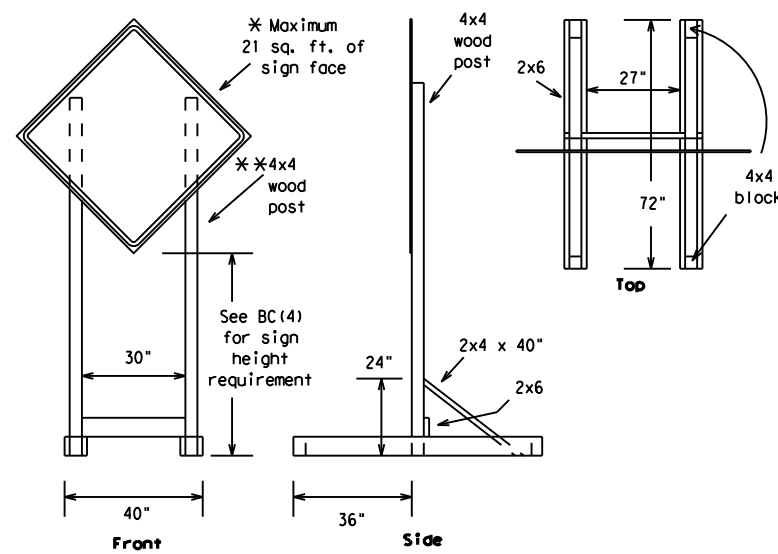
Texas Department of Transportation Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC (4) - 21

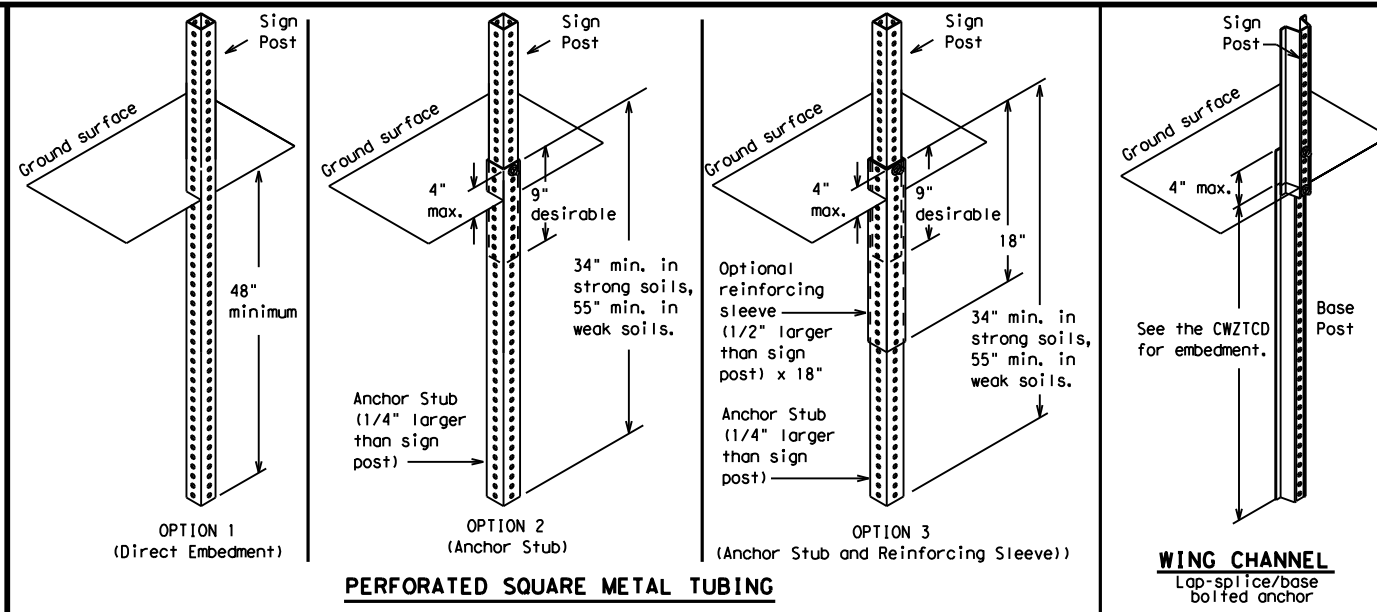
FILE: bc-21.dgn	DW: TxDOT	CR: TxDOT	OW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0205	02	067	US 79
9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	BRY	ROBERTSON	13	

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



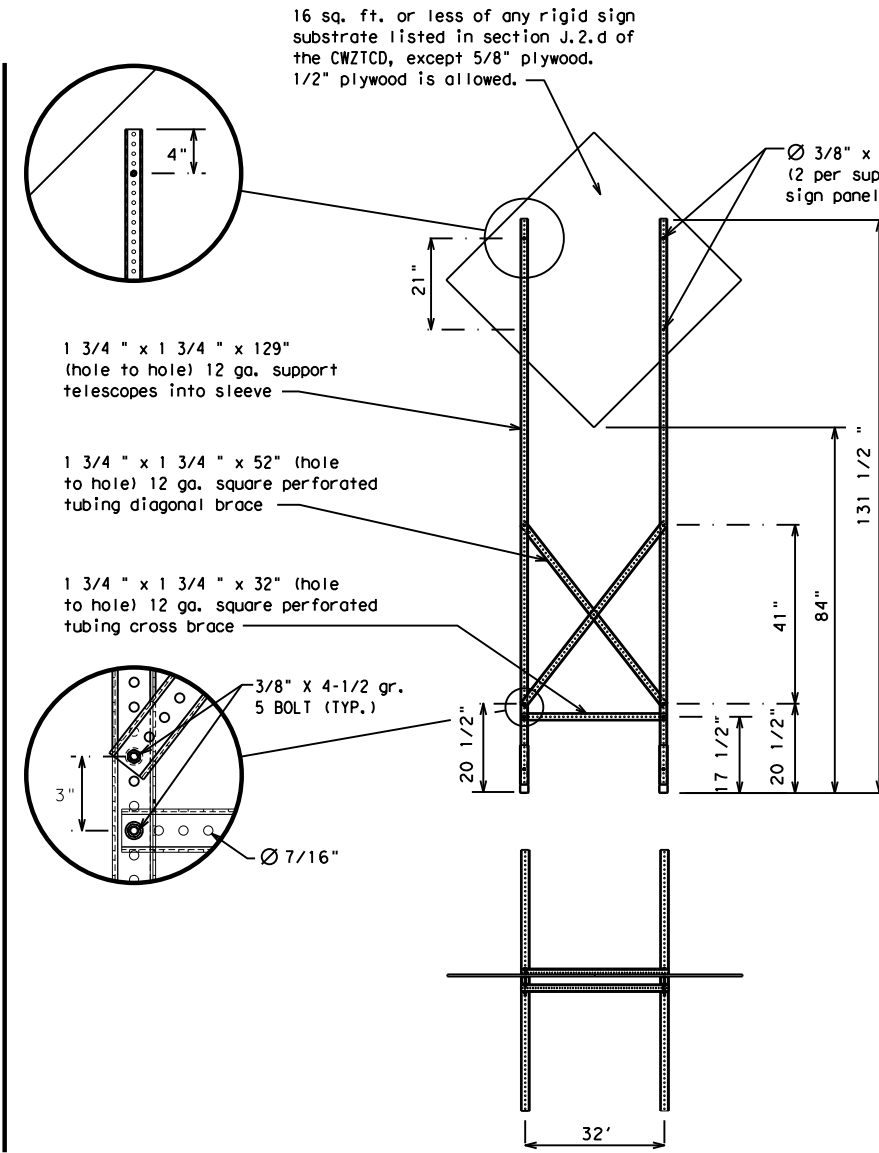
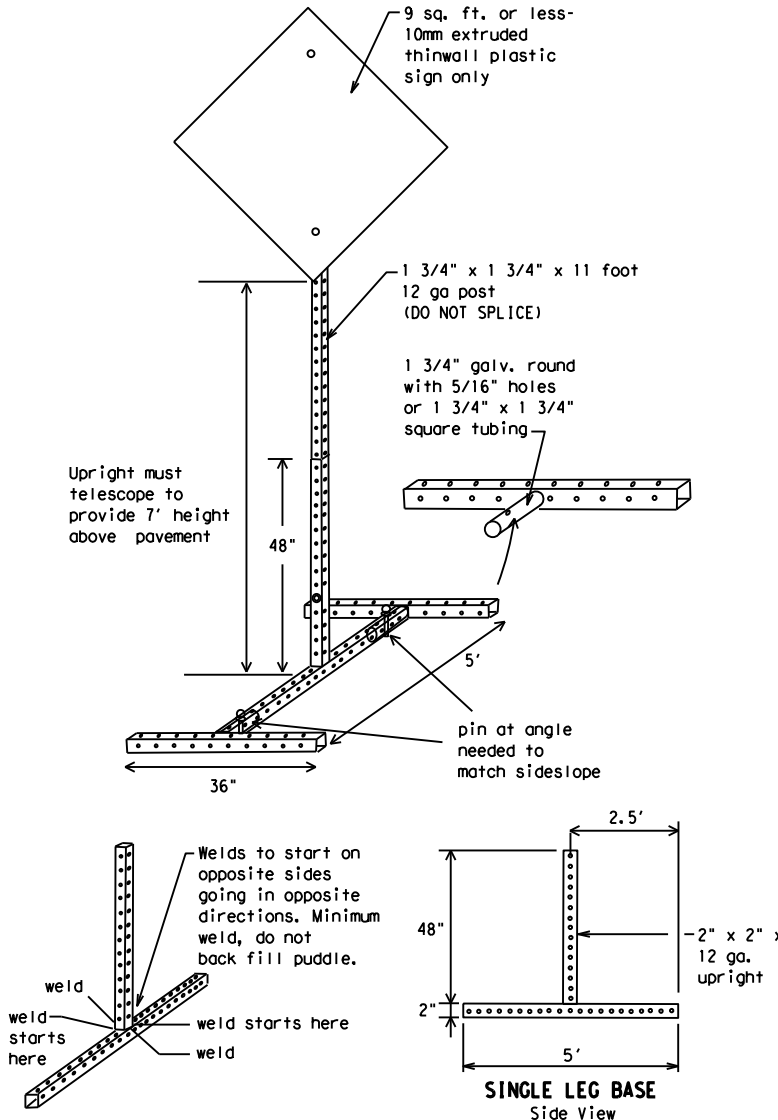
SKID MOUNTED WOOD SIGN SUPPORTS

* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS



GROUND MOUNTED SIGN SUPPORTS

Refer to the CWZTCD and the manufacturer's installation procedure for each type sign support. The maximum sign square footage shall adhere to the manufacturer's recommendation. Two post installations can be used for larger signs.



SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

WEDGE ANCHORS

Both steel and plastic Wedge Anchor Systems as shown on the SMD Standard Sheets may be used as temporary sign supports for signs up to 10 square feet of sign face. They may be set in concrete or in sturdy soils if approved by the Engineer. (See web address for "Traffic Engineering Standard Sheets" on BC(1)).

OTHER DESIGNS

MORE DETAILS OF APPROVED LONG/INTERMEDIATE AND SHORT TERM SUPPORTS CAN BE FOUND ON THE CWZTCD LIST. SEE BC(1) FOR WEBSITE LOCATION.

GENERAL NOTES

- Nails may be used in the assembly of wooden sign supports, but 3/8 inch bolts with nuts or 3/8 inch x 3 1/2 inch lag screws must be used on every joint for final connection.
- No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCD List.
- When project is completed, all sign supports and foundations shall be removed from the project site. This will be considered subsidiary to Item 502.

- * See BC(4) for definition of "Work Duration."
- ** Wood sign posts MUST be one piece. Splicing will NOT be allowed. Posts shall be painted white.
- See the CWZTCD for the type of sign substrate that can be used for each approved sign support.

SHEET 5 OF 12



BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5) - 21

FILE:	bc-21.dgn	DN:	TxDOT	CK:	TxDOT	DW:	TxDOT	CR:	TxDOT
©TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY				
REVISIONS		0205	02	067	US 79				
9-07	8-14	DIST	COUNTY	SHEET NO.					
7-13	5-21	BRY	ROBERTSON	14					

DATE:
FILE:

WHEN NOT IN USE, REMOVE THE PCMS FROM THE RIGHT-OF-WAY OR PLACE THE PCMS BEHIND BARRIER OR GUARDRAIL WITH SIGN PANEL TURNED PARALLEL TO TRAFFIC

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

(The Engineer may approve other messages not specifically covered here.)

PORTABLE CHANGEABLE MESSAGE SIGNS

- The Engineer/Inspector shall approve all messages used on portable changeable message signs (PCMS).
- Messages on PCMS should contain no more than 8 words (about four to eight characters per word), not including simple words such as "TO," "FOR," "AT," etc.
- Messages should consist of a single phase, or two phases that alternate. Three-phase messages are not allowed. Each phase of the message should convey a single thought, and must be understood by itself.
- Use the word "EXIT" to refer to an exit ramp on a freeway; i.e., "EXIT CLOSED." Do not use the term "RAMP."
- Always use the route or interstate designation (IH, US, SH, FM) along with the number when referring to a roadway.
- When in use, the bottom of a stationary PCMS message panel should be a minimum 7 feet above the roadway, where possible.
- The message term "WEEKEND" should be used only if the work is to start on Saturday morning and end by Sunday evening at midnight. Actual days and hours of work should be displayed on the PCMS if work is to begin on Friday evening and/or continue into Monday morning.
- The Engineer/Inspector may select one of two options which are available for displaying a two-phase message on a PCMS. Each phase may be displayed for either four seconds each or for three seconds each.
- Do not "flash" messages or words included in a message. The message should be steady burn or continuous while displayed.
- Do not present redundant information on a two-phase message; i.e., keeping two lines of the message the same and changing the third line.
- Do not use the word "Danger" in message.
- Do not display the message "LANES SHIFT LEFT" or "LANES SHIFT RIGHT" on a PCMS. Drivers do not understand the message.
- Do not display messages that scroll horizontally or vertically across the face of the sign.
- The following table lists abbreviated words and two-word phrases that are acceptable for use on a PCMS. Both words in a phrase must be displayed together. Words or phrases not on this list should not be abbreviated, unless shown in the TMUTCD.
- PCMS character height should be at least 18 inches for trailer mounted units. They should be visible from at least 1/2 (.5) mile and the text should be legible from at least 600 feet at night and 800 feet in daylight. Truck mounted units must have a character height of 10 inches and must be legible from at least 400 feet.
- Each line of text should be centered on the message board rather than left or right justified.
- If disabled, the PCMS should default to an illegible display that will not alarm motorists and will only be used to alert workers that the PCMS has malfunctioned. A pattern such as a series of horizontal solid bars is appropriate.

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

FREEWAY CLOSED X MILE
ROAD CLOSED AT SH XXX
ROAD CLSD AT FM XXXX
RIGHT X LANES CLOSED
CENTER LANE CLOSED
NIGHT LANE CLOSURES
VARIOUS LANES CLOSED
EXIT CLOSED
MALL DRIVEWAY CLOSED
XXXXXXXX BLVD CLOSED

Other Condition List

FRONTAGE ROAD CLOSED
SHOULDER CLOSED XXX FT
RIGHT LN CLOSED XXX FT
RIGHT X LANES OPEN
DAYTIME LANE CLOSURES
I-XX SOUTH EXIT CLOSED
EXIT XXX CLOSED X MILE
RIGHT LN TO BE CLOSED
X LANES CLOSED TUE - FRI
ROADWORK XXX FT
FLAGGER XXXX FT
RIGHT LN NARROWS XXXX FT
MERGING TRAFFIC XXXX FT
LOOSE GRAVEL XXXX FT
DETOUR X MILE
ROADWORK PAST SH XXXX
BUMP XXXX FT
TRAFFIC SIGNAL XXXX FT
ROAD REPAIRS XXXX FT
LANE NARROWS XXXX FT
TWO-WAY TRAFFIC XX MILE
CONST TRAFFIC XXX FT
UNEVEN LANES XXXX FT
ROUGH ROAD XXXX FT
ROADWORK NEXT FRI-SUN
US XXX EXIT X MILES
LANES SHIFT *

* LANES SHIFT in Phase 1 must be used with STAY IN LANE in Phase 2.

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

MERGE RIGHT
DETOUR NEXT X EXITS
USE EXIT XXX
STAY ON US XXX SOUTH
TRUCKS USE US XXX N
WATCH FOR TRUCKS
EXPECT DELAYS
REDUCE SPEED XXX FT
USE OTHER ROUTES
STAY IN LANE *

FORM X LINES RIGHT
USE XXXXX RD EXIT
USE EXIT I-XX NORTH
USE I-XX E TO I-XX N
WATCH FOR TRUCKS
EXPECT DELAYS
PREPARE TO STOP
END SHOULDER USE
WATCH FOR WORKERS

Location List

AT FM XXXX
BEFORE RAILROAD CROSSING
NEXT X MILES
PAST US XXX EXIT
XXXXXXXX TO XXXXXX
US XXX TO FM XXXX

Warning List

SPEED LIMIT XX MPH
MAXIMUM SPEED XX MPH
MINIMUM SPEED XX MPH
ADVISORY SPEED XX MPH
RIGHT LANE EXIT
USE CAUTION
DRIVE SAFELY
DRIVE WITH CARE

** Advance Notice List

TUE-FRI XX AM-X PM
APR XX-XX X PM-X AM
BEGINS MONDAY
BEGINS MAY XX
MAY X-X XX PM-XX AM
NEXT FRI-SUN
XX AM TO XX PM
NEXT TUE AUG XX
TONIGHT XX PM-XX AM

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

- Only 1 or 2 phases are to be used on a PCMS.
- The 1st phase (or both) should be selected from the "Road/Lane/Ramp Closure List" and the "Other Condition List".
- A 2nd phase can be selected from the "Action to Take/Effect on Travel, Location, General Warning, or Advance Notice Phase Lists".
- A Location Phase is necessary only if a distance or location is not included in the first phase selected.
- If two PCMS are used in sequence, they must be separated by a minimum of 1000 ft. Each PCMS shall be limited to two phases, and should be understandable by themselves.
- For advance notice, when the current date is within seven days of the actual work date, calendar days should be replaced with days of the week. Advance notification should typically be for no more than one week prior to the work.

WORDING ALTERNATIVES

- The words RIGHT, LEFT and ALL can be interchanged as appropriate.
- Roadway designations IH, US, SH, FM and LP can be interchanged as appropriate.
- EAST, WEST, NORTH and SOUTH (or abbreviations E, W, N and S) can be interchanged as appropriate.
- Highway names and numbers replaced as appropriate.
- ROAD, HIGHWAY and FREEWAY can be interchanged as needed.
- AHEAD may be used instead of distances if necessary.
- FT and MI, MILE and MILES interchanged as appropriate.
- AT, BEFORE and PAST interchanged as needed.
- Distances or AHEAD can be eliminated from the message if a location phase is used.

PCMS SIGNS WITHIN THE R.O.W. SHALL BE BEHIND GUARDRAIL OR CONCRETE BARRIER OR SHALL HAVE A MINIMUM OF FOUR (4) PLASTIC DRUMS PLACED PERPENDICULAR TO TRAFFIC ON THE UPSTREAM SIDE OF THE PCMS, WHEN EXPOSED TO ONE DIRECTION OF TRAFFIC. WHEN EXPOSED TO TWO WAY TRAFFIC, THE FOUR DRUMS SHOULD BE PLACED WITH ONE DRUM AT EACH OF THE FOUR CORNERS OF THE UNIT.

FULL MATRIX PCMS SIGNS

- When Full Matrix PCMS signs are used, the character height and legibility/visibility requirements shall be maintained as listed in Note 15 under "PORTABLE CHANGEABLE MESSAGE SIGNS" above.
- When symbol signs, such as the "Flagger Symbol" (CW20-7) are represented graphically on the Full Matrix PCMS sign and, with the approval of the Engineer, it shall maintain the legibility/visibility requirement listed above.
- When symbol signs are represented graphically on the Full Matrix PCMS, they shall only supplement the use of the static sign represented, and shall not substitute for, or replace that sign.
- A full matrix PCMS may be used to simulate a flashing arrow board provided it meets the visibility, flash rate and dimming requirements on BC(7), for the same size arrow.

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: FILE:

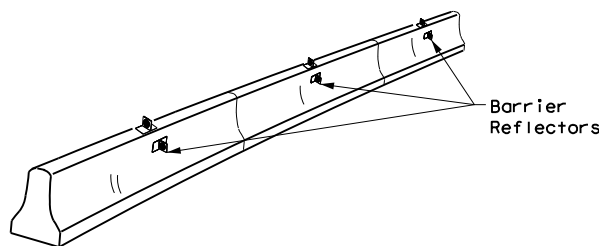
WORD OR PHRASE	ABBREVIATION	WORD OR PHRASE	ABBREVIATION
Access Road	ACCS RD	Major	MAJ
Alternate	ALT	Miles	MI
Avenue	AVE	Miles Per Hour	MPH
Best Route	BEST RTE	Minor	MNR
Boulevard	BLVD	Monday	MON
Bridge	BRDG	Normal	NORM
Canal	CANT	North	N
Center	CTR	Northbound	(route) N
Construction Ahead	CONST AHD	Parking	PKING
CROSSING	XING	Road	RD
Detour Route	DETOUR RTE	Right Lane	RT LN
Do Not	DONT	Saturday	SAT
East	E	Service Road	SERV RD
Eastbound	(route) E	Shoulder	SHLDR
Emergency	EMER	Slippery	SLIP
Emergency Vehicle	EMER VEH	South	S
Entrance, Enter	ENT	Southbound	(route) S
Express Lane	EXP LN	Speed	SPD
Expressway	EXPWY	Street	ST
XXXX Feet	XXXX FT	Sunday	SUN
Fog Ahead	FOG AHD	Telephone	PHONE
Freeway	FRWY, FWY	Temporary	TEMP
Freeway Blocked	FWY BLKD	Thursday	THURS
Friday	FRI	To Downtown	TO DWNTN
Hazardous Driving	HAZ DRIVING	Traffic	TRAF
Hazardous Material	HAZMAT	Travelers	TRVLR
High-Occupancy Vehicle	HOV	Tuesday	TUES
Highway	Hwy	Time Minutes	TIME MIN
Hour(s)	HR, HRS	Upper Level	UPR LEVEL
Information	INFO	Vehicles (s)	VEH, VEHS
It Is	ITS	Warning	WARN
Junction	JCT	Wednesday	WED
Left	LFT	Weight Limit	WT LIMIT
Left Lane	LFT LN	West	W
Lane Closed	LN CLOSED	Westbound	(route) W
Lower Level	LWR LEVEL	Wet Pavement	WET PVMT
Maintenance	MAINT	Will Not	WONT

Roadway designation # IH-number, US-number, SH-number, FM-number

<h3>BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)</h3>			
<h2>BC (6) - 21</h2>			
FILE:	bc-21.dgn	DN:	TxDOT
© TxDOT	November 2002	CR:	TxDOT
REVISIONS	0205	OW:	TxDOT
9-07	8-14	CK:	TxDOT
7-13	5-21	CONT:	02
		SECT:	067
		JOB:	US 79
		DIST:	COUNTY
		BRY:	ROBERTSON
		SHEET NO.:	15

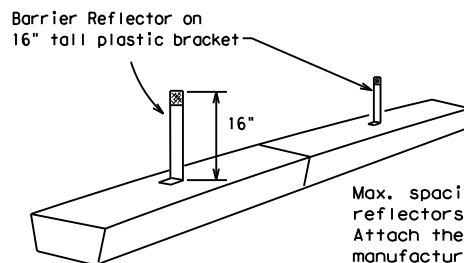
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

- Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
- Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost of the reflectors shall be considered subsidiary to Item 512.



CONCRETE TRAFFIC BARRIER (CTB)

- Where traffic is on one side of the CTB, two (2) Barrier Reflectors shall be mounted in approximately the midsection of each section of CTB. An alternate mounting location is uniformly spaced at one end of each CTB. This will allow for attachment of a barrier grapple without damaging the reflector. The Barrier Reflector mounted on the side of the CTB shall be located directly below the reflector mounted on top of the barrier, as shown in the detail above.
- Where CTB separates two-way traffic, three barrier reflectors shall be mounted on each section of CTB. The reflector unit on top shall have two yellow reflective faces (Bi-Directional) while the reflectors on each side of the barrier shall have one yellow reflective face, as shown in the detail above.
- When CTB separates traffic traveling in the same direction, no barrier reflectors will be required on top of the CTB.
- Barrier Reflector units shall be yellow or white in color to match the edgeline being supplemented.
- Maximum spacing of Barrier Reflectors is forty (40) feet.
- Pavement markers or temporary flexible-reflective roadway marker tabs shall NOT be used as CTB delineation.
- Attachment of Barrier Reflectors to CTB shall be per manufacturer's recommendations.
- Missing or damaged Barrier Reflectors shall be replaced as directed by the Engineer.
- Single slope barriers shall be delineated as shown on the above detail.

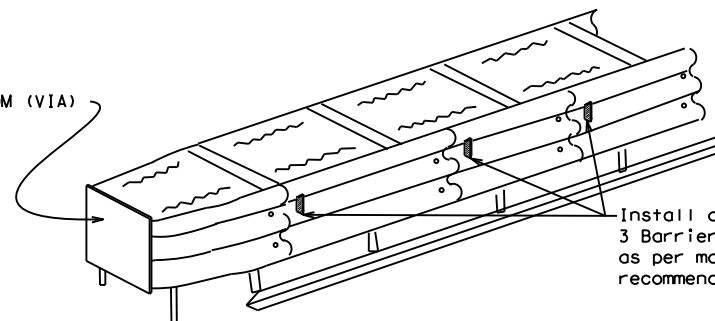


LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

LPCB is approved for use in work zone locations, where the posted speed is 45mph, or less. See Roadway Standard Sheet LPCB.

Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB)



DELINEATION OF END TREATMENTS

END TREATMENTS FOR CTB'S USED IN WORK ZONES

End treatments used on CTB's in work zones shall meet the appropriate crashworthy standards as defined in the Manual for Assessing Safety Hardware (MASH). Refer to the CWZTCD List for approved end treatments and manufacturers.

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS

WARNING LIGHTS

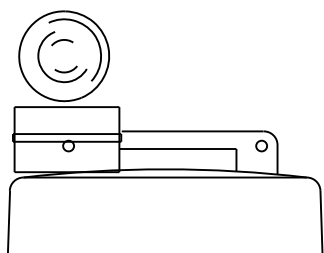
- Warning lights shall meet the requirements of the TMUTCD.
- Warning lights shall NOT be installed on barricades.
- Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "FL". The Type A Warning Lights shall not be used with signs manufactured with Type B_{FL} or C_{FL} Sheeting meeting the requirements of Departmental Material Specification DMS-8300.
- Type-C and Type D 360 degree Steady Burn Lights are intended to be used in a series for delineation to supplement other traffic control devices. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "SB".
- The Engineer/Inspector or the plans shall specify the location and type of warning lights to be installed on the traffic control devices.
- When required by the Engineer, the Contractor shall furnish a copy of the warning lights certification. The warning light manufacturer will certify the warning lights meet the requirements of the latest ITE Purchase Specifications for Flashing and Steady-Burn Warning Lights.
- When used to delineate curves, Type-C and Type D Steady Burn Lights should only be placed on the outside of the curve, not the inside.
- The location of warning lights and warning reflectors on drums shall be as shown elsewhere in the plans.

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

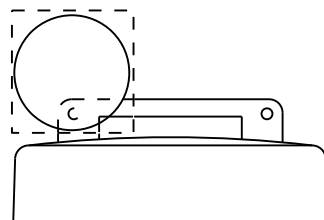
- Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
- Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
- A series of sequential flashing warning lights placed on channelizing devices to form a merging taper may be used for delineation. If used, the successive flashing of the sequential warning lights should occur from the beginning of the taper to the end of the merging taper in order to identify the desired vehicle path. The rate of flashing for each light shall be 65 flashes per minute, plus or minus 10 flashes.
- Type C and D steady-burn warning lights are intended to be used in a series to delineate the edge of the travel lane on detours, on lane changes, on lane closures, and on other similar conditions.
- Type A, Type C and Type D warning lights shall be installed at locations as detailed on other sheets in the plans.
- Warning lights shall not be installed on a drum that has a sign, chevron or vertical panel.
- The maximum spacing for warning lights on drums should be identical to the channelizing device spacing.

WARNING REFLECTORS MOUNTED ON PLASTIC DRUMS AS A SUBSTITUTE FOR TYPE C (STEADY BURN) WARNING LIGHTS

- A warning reflector or approved substitute may be mounted on a plastic drum as a substitute for a Type C, steady burn warning light at the discretion of the Contractor unless otherwise noted in the plans.
- The warning reflector shall be yellow in color and shall be manufactured using a sign substrate approved for use with plastic drums listed on the CWZTCD.
- The warning reflector shall have a minimum retroreflective surface area (one-side) of 30 square inches.
- Round reflectors shall be fully reflectorized, including the area where attached to the drum.
- Square substrates must have a minimum of 30 square inches of reflectorized sheeting. They do not have to be reflectorized where it attaches to the drum.
- The side of the warning reflector facing approaching traffic shall have sheeting meeting the color and retroreflectivity requirements for DMS 8300-Type B or Type C.
- When used near two-way traffic, both sides of the warning reflector shall be reflectorized.
- The warning reflector should be mounted on the side of the handle nearest approaching traffic.
- The maximum spacing for warning reflectors should be identical to the channelizing device spacing requirements.



Type C Warning Light or approved substitute mounted on a drum adjacent to the travel way.

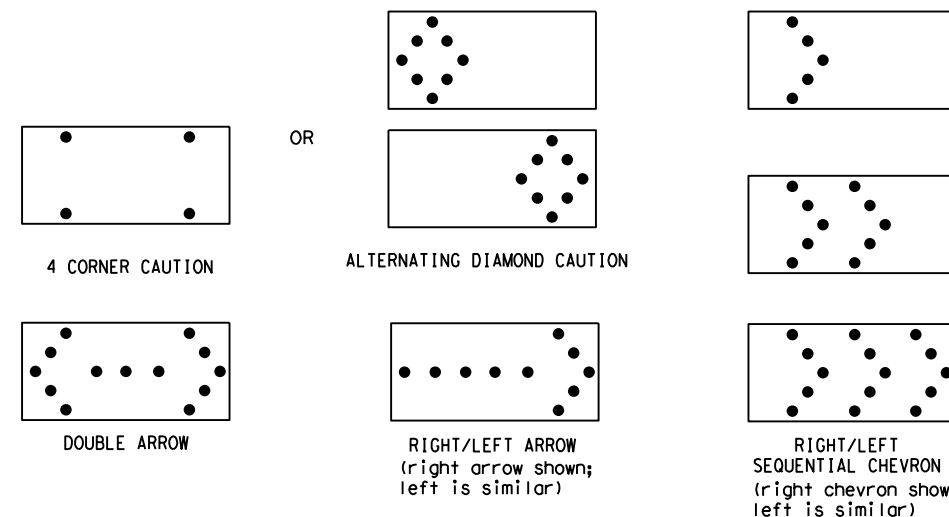


Warning reflector may be round or square. Must have a yellow reflective surface area of at least 30 square inches

DATE:
FILE:

Arrow Boards may be located behind channelizing devices in place for a shoulder taper or merging taper, otherwise they shall be delineated with four (4) channelizing devices placed perpendicular to traffic on the upstream side of traffic.

- The Flashing Arrow Board should be used for all lane closures on multi-lane roadways, or slow moving maintenance or construction activities on the travel lanes.
- Flashing Arrow Boards should not be used on two-lane, two-way roadways, detours, diversions or work on shoulders unless the "CAUTION" display (see detail below) is used.
- The Engineer/Inspector shall choose all appropriate signs, barricades and/or other traffic control devices that should be used in conjunction with the Flashing Arrow Board.
- The Flashing Arrow Board should be able to display the following symbols:



- The "CAUTION" display consists of four corner lamps flashing simultaneously, or the Alternating Diamond Caution mode as shown.
- The straight line caution display is NOT ALLOWED.
- The Flashing Arrow Board shall be capable of minimum 50 percent dimming from rated lamp voltage. The flashing rate of the lamps shall not be less than 25 nor more than 40 flashes per minute.
- Minimum lamp "on time" shall be approximately 50 percent for the flashing arrow and equal intervals of 25 percent for each sequential phase of the flashing chevron.
- The sequential arrow display is NOT ALLOWED.
- The flashing arrow display is the TxDOT standard; however, the sequential chevron display may be used during daylight operations.
- The Flashing Arrow Board shall be mounted on a vehicle, trailer or other suitable support.
- A Flashing Arrow Board SHALL NOT BE USED to laterally shift traffic.
- A full matrix PCMS may be used to simulate a Flashing Arrow Board provided it meets visibility, flash rate and dimming requirements on this sheet for the same size arrow.
- Minimum mounting height of trailer mounted Arrow Boards should be 7 feet from roadway to bottom of panel.

REQUIREMENTS			
TYPE	MINIMUM SIZE	MINIMUM NUMBER OF PANEL LAMPS	MINIMUM VISIBILITY DISTANCE
B	30 x 60	13	3/4 mile
C	48 x 96	15	1 mile

ATTENTION
Flashing Arrow Boards shall be equipped with automatic dimming devices.

WHEN NOT IN USE, REMOVE THE ARROW BOARD FROM THE RIGHT-OF-WAY OR PLACE THE ARROW BOARD BEHIND CONCRETE TRAFFIC BARRIER OR GUARDRAIL.

FLASHING ARROW BOARDS

SHEET 7 OF 12

TRUCK-MOUNTED ATTENUATORS

- Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the Manual for Assessing Safety Hardware (MASH).
- Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
- Refer to the CWZTCD for a list of approved TMAs.
- TMAs are required on freeways unless otherwise noted in the plans.
- A TMA should be used anytime that it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the work performance.
- The only reason a TMA should not be required is when a work area is spread down the roadway and the work crew is an extended distance from the TMA.



BARRICADE AND CONSTRUCTION ARROW PANEL, REFLECTORS, WARNING LIGHTS & ATTENUATOR

BC (7) -21

FILE:	bc-21.dgn	DN:	TxDOT	CR:	TxDOT	OW:	TxDOT	CK:	TxDOT
© TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY				
REVISIONS		0205	02	067	US 79				
9-07	8-14	DIST	COUNTY		SHEET NO.				
7-13	5-21	BRY	ROBERTSON		16				

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: FILE:

GENERAL NOTES

- For long term stationary work zones on freeways, drums shall be used as the primary channelizing device.
- For intermediate term stationary work zones on freeways, drums should be used as the primary channelizing device but may be replaced in tangent sections by vertical panels, or 42" two-piece cones. In tangent sections, one-piece cones may be used with the approval of the Engineer but only if personnel are present on the project at all times to maintain the cones in proper position and location.
- For short term stationary work zones on freeways, drums are the preferred channelizing device but may be replaced in tapers, transitions and tangent sections by vertical panels, two-piece cones or one-piece cones as approved by the Engineer.
- Drums and all related items shall comply with the requirements of the current version of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
- Drums, bases, and related materials shall exhibit good workmanship and shall be free from objectionable marks or defects that would adversely affect their appearance or serviceability.
- The Contractor shall have a maximum of 24 hours to replace any plastic drums identified for replacement by the Engineer/Inspector. The replacement device must be an approved device.

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

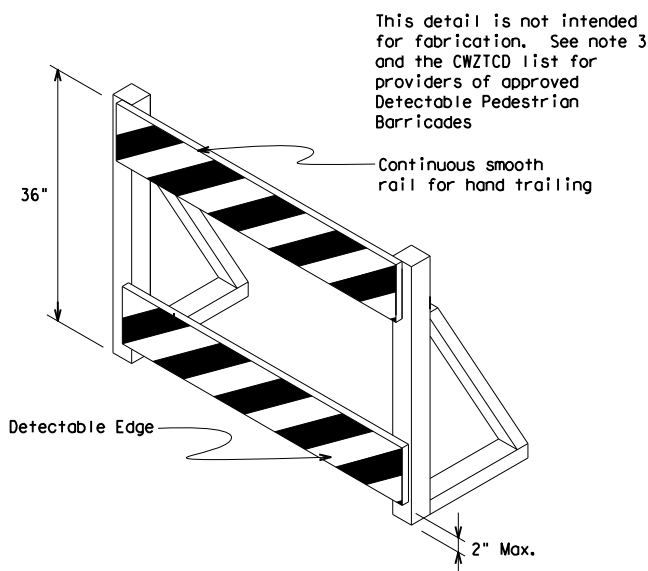
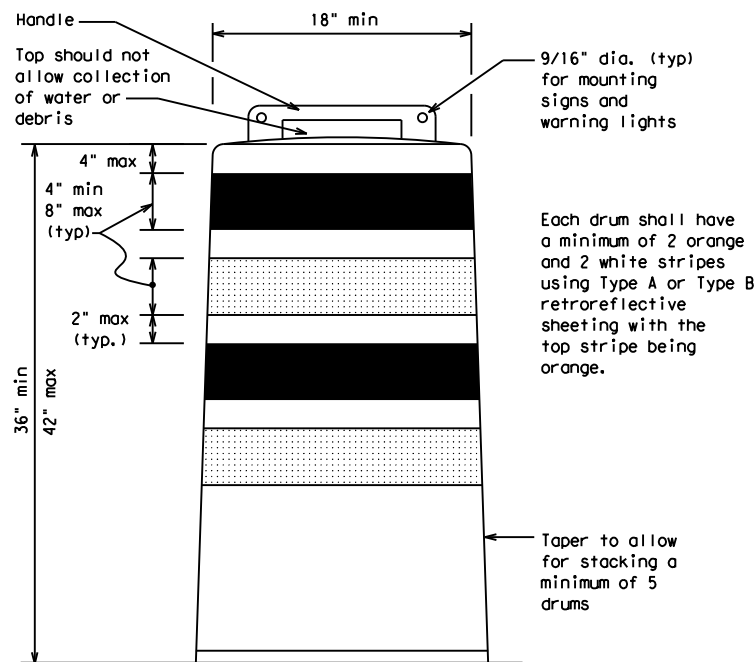
- Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
- The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents accidental separation due to normal handling and/or air turbulence created by passing vehicles.
- Plastic drums shall be constructed of lightweight flexible, and deformable materials. The Contractor shall NOT use metal drums or single piece plastic drums as channelization devices or sign supports.
- Drums shall present a profile that is a minimum of 18 inches in width at the 36 inch height when viewed from any direction. The height of drum unit (body installed on base) shall be a minimum of 36 inches and a maximum of 42 inches.
- The top of the drum shall have a built-in handle for easy pickup and shall be designed to drain water and not collect debris. The handle shall have a minimum of two widely spaced 9/16 inch diameter holes to allow attachment of a warning light, warning reflector unit or approved compliant sign.
- The exterior of the drum body shall have a minimum of four alternating orange and white retroreflective circumferential stripes not less than 4 inches nor greater than 8 inches in width. Any non-reflectORIZED space between any two adjacent stripes shall not exceed 2 inches in width.
- Bases shall have a maximum width of 36 inches, a maximum height of 4 inches, and a minimum of two footholds of sufficient size to allow base to be held down while separating the drum body from the base.
- Plastic drums shall be constructed of ultra-violet stabilized, orange, high-density polyethylene (HDPE) or other approved material.
- Drum body shall have a maximum unballasted weight of 11 lbs.
- Drum and base shall be marked with manufacturer's name and model number.

RETROREFLECTIVE SHEETING

- The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
- The sheeting shall be suitable for use on and shall adhere to the drum surface such that, upon vehicular impact, the sheeting shall remain adhered in-place and exhibit no delaminating, cracking, or loss of retroreflectivity other than that loss due to abrasion of the sheeting surface.

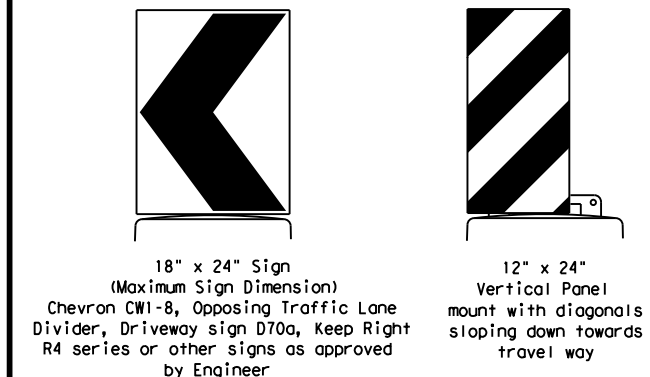
BALLAST

- Unballasted bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 35 lbs (minimum) and 50 lbs (maximum). The ballast may be sand in one to three sandbags separate from the base, sand in a sand-filled plastic base, or other ballasting devices as approved by the Engineer. Stacking of sandbags will be allowed, however height of sandbags above pavement surface may not exceed 12 inches.
- Bases with built-in ballast shall weigh between 40 lbs. and 50 lbs. Built-in ballast can be constructed of an integral crumb rubber base or a solid rubber base.
- Recycled truck tire sidewalls may be used for ballast on drums approved for this type of ballast on the CWZTCD list.
- The ballast shall not be heavy objects, water, or any material that would become hazardous to motorists, pedestrians, or workers when the drum is struck by a vehicle.
- When used in regions susceptible to freezing, drums shall have drainage holes in the bottoms so that water will not collect and freeze becoming a hazard when struck by a vehicle.
- Ballast shall not be placed on top of drums.
- Adhesives may be used to secure base of drums to pavement.



DETECTABLE PEDESTRIAN BARRICADES

- When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility. Refer to WZ(BTS-2) for Pedestrian Control requirements for Sidewalk Diversions, Sidewalk Detours and Crosswalk Closures.
- Where pedestrians with visual disabilities normally use the closed sidewalk, a Detectable Pedestrian Barricade shall be placed across the full width of the closed sidewalk instead of a Type 3 Barricade.
- Detectable pedestrian barricades similar to the one pictured above, longitudinal channelizing devices, some concrete barriers, and wood or chain link fencing with a continuous detectable edging can satisfactorily delineate a pedestrian path.
- Tape, rope, or plastic chain strung between devices are not detectable, do not comply with the design standards in the "Americans with Disabilities Act Accessibility Guidelines (ADAAG)" and should not be used as a control for pedestrian movements.
- Warning lights shall not be attached to detectable pedestrian barricades.
- Detectable pedestrian barricades should use 8" nominal barricade rails as shown on BC(10) provided that the top rail provides a smooth continuous rail suitable for hand trailing with no splinters, burrs, or sharp edges.



18" x 24" Sign
(Maximum Sign Dimension)
Chevron CW1-8, Opposing Traffic Lane
Divider, Driveway sign D70a, Keep Right
R4 series or other signs as approved
by Engineer

12" x 24"
Vertical Panel
mount with diagonals
sloping down towards
travel way

Plywood, Aluminum or Metal sign
substrates shall NOT be used on
plastic drums

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

- Signs used on plastic drums shall be manufactured using substrates listed on the CWZTCD.
- Chevrons and other work zone signs with an orange background shall be manufactured with Type B_{FL} or Type C_{FL} Orange sheeting meeting the color and retroreflectivity requirements of DMS-8300, "Sign Face Material," unless otherwise specified in the plans.
- Vertical Panels shall be manufactured with orange and white sheeting meeting the requirements of DMS-8300 Type A or Type B. Diagonal stripes on Vertical Panels shall slope down toward the intended traveled lane.
- Other sign messages (text or symbolic) may be used as approved by the Engineer. Sign dimensions shall not exceed 18 inches in width or 24 inches in height, except for the R9 series signs discussed in note 8 below.
- Signs shall be installed using a 1/2 inch bolt (nominal) and nut, two washers, and one locking washer for each connection.
- Mounting bolts and nuts shall be fully engaged and adequately torqued. Bolts should not extend more than 1/2 inch beyond nuts.
- Chevrons may be placed on drums on the outside of curves, on merging tapers or on shifting tapers. When used in these locations, they may be placed on every drum or spaced not more than on every third drum. A minimum of three (3) should be used at each location called for in the plans.
- R9-9, R9-10, R9-11 and R9-11a Sidewalk Closed signs which are 24 inches wide may be mounted on plastic drums, with approval of the Engineer.

SHEET 8 OF 12

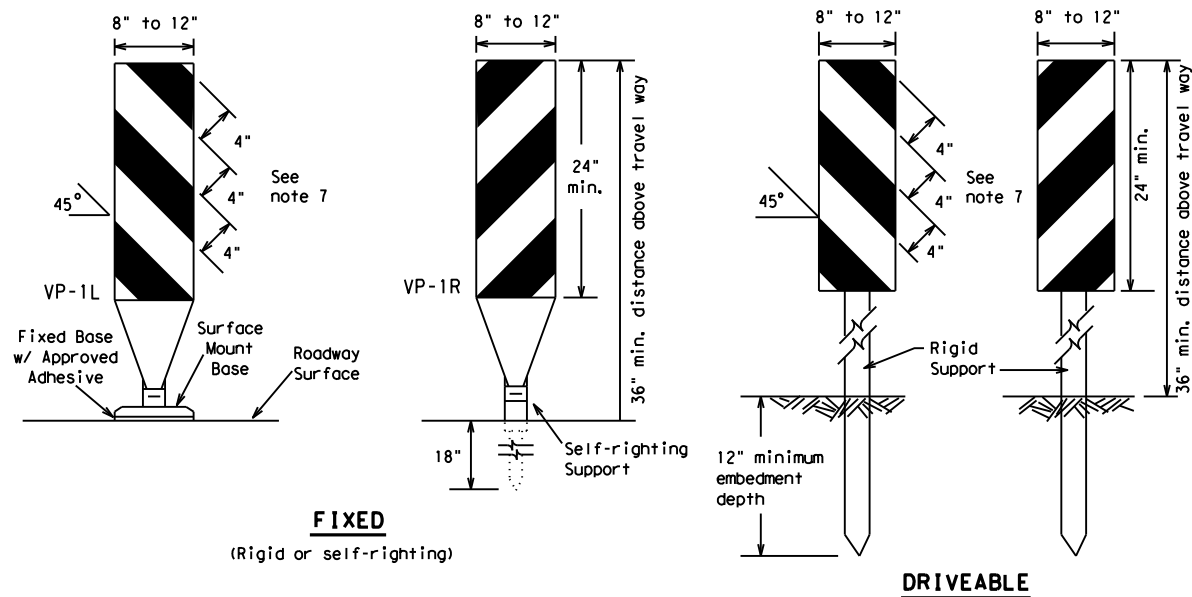


BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

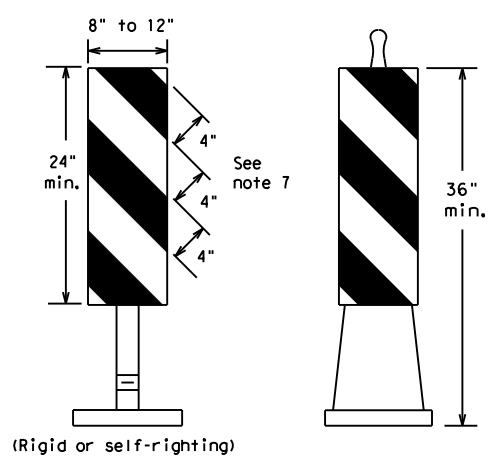
FILE:	bc-21.dgn	DW:	TxDOT	CK:	TxDOT	DW:	TxDOT	CK:	TxDOT
© TxDOT	November 2002	CONT:		SECT:		JOB:		HIGHWAY:	
REVISIONS		0205	02	067		US 79			
4-03	8-14	DIST:		COUNTY:		SHEET NO.			
9-07	5-21	BRY		ROBERTSON		17			
7-13									

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



FIXED
(Rigid or self-righting)

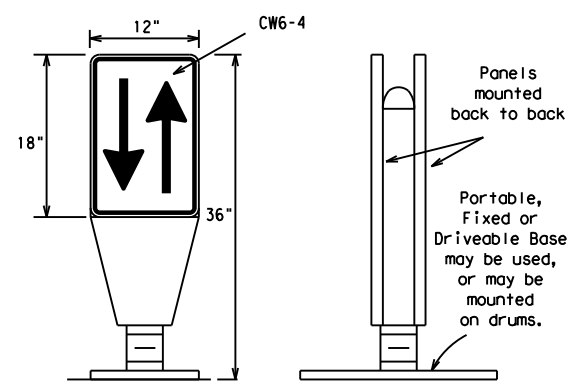
DRIVEABLE



PORTABLE

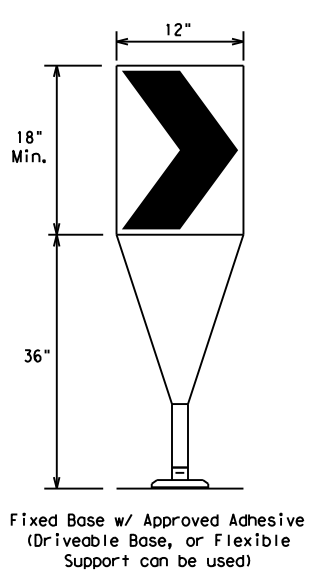
VERTICAL PANELS (VPs)

- Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
- VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is required. The Engineer/Inspector shall refer to the Roadway Design Manual for additional requirements on the use VP's for drop-offs.
- VP's should be mounted back to back if used at the edge of cuts adjacent to two-way two lane roadways. Stripes are to be reflective orange and reflective white and should always slope downward toward the travel lane.
- VP's used on expressways and freeways or other high speed roadways, may have more than 270 square inches of retroreflective area facing traffic.
- Self-righting supports are available with portable base. See "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
- Sheeting for the VP's shall be retroreflective Type A or Type B conforming to Departmental Material Specification DMS-8300, unless noted otherwise.
- Where the height of reflective material on the vertical panel is 36 inches or greater, a panel stripe of 6 inches shall be used.



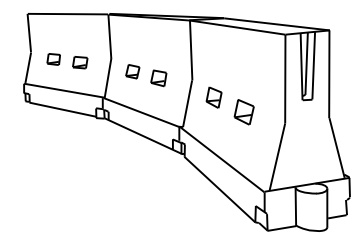
OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

- Opposing Traffic Lane Dividers (OTLD) are delineation devices designed to convert a normal one-way roadway section to two-way operation. OTLD's are used on temporary centerlines. The upward and downward arrows on the sign's face indicate the direction of traffic on either side of the divider. The base is secured to the pavement with an adhesive or rubber weight to minimize movement caused by a vehicle impact or wind gust.
- The OTLD may be used in combination with 42" cones or VPs.
- Spacing between the OTLD shall not exceed 500 feet. 42" cones or VPs placed between the OTLD's should not exceed 100 foot spacing.
- The OTLD shall be orange with a black non-reflective legend. Sheeting for the OTLD shall be retroreflective Type B_{FL} or Type C_{FL} conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.



- The chevron shall be a vertical rectangle with a minimum size of 12 by 18 inches.
- Chevrons are intended to give notice of a sharp change of alignment with the direction of travel and provide additional emphasis and guidance for vehicle operators with regard to changes in horizontal alignment of the roadway.
- Chevrons, when used, shall be erected on the outside of a sharp curve or turn, or on the far side of an intersection. They shall be in line with and at right angles to approaching traffic. Spacing should be such that the motorist always has three in view, until the change in alignment eliminates its need.
- To be effective, the chevron should be visible for at least 500 feet.
- Chevrons shall be orange with a black nonreflective legend. Sheeting for the chevron shall be retroreflective Type B_{FL} or Type C_{FL} conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.
- For Long Term Stationary use on tapers or transitions on freeways and divided highways, self-righting chevrons may be used to supplement plastic drums but not to replace plastic drums.

CHEVRONS



LONGITUDINAL CHANNELIZING DEVICES (LCD)

- LCDs are crashworthy, lightweight, deformable devices that are highly visible, have good target value and can be connected together. They are not designed to contain or redirect a vehicle on impact.
- LCDs may be used instead of a line of cones or drums.
- LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
- LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
- LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
- LCDs used as barricades placed perpendicular to traffic should have at least one row of reflective sheeting meeting the requirements for barricade rails as shown on BC(10). Place reflective sheeting near the top of the LCD along the full length of the device.

WATER BALLASTED SYSTEMS USED AS BARRIERS

- Water ballasted systems used as barriers shall not be used solely to channelize road users, but also to protect the work space per the appropriate Manual for Assessing Safety Hardware (MASH) crashworthiness requirements based on roadway speed and barrier application.
- Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve daytime/nighttime visibility. They may also be supplemented with pavement markings.
- Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
- Water ballasted systems used as barriers should not be used for a merging taper except in low speed (less than 45 MPH) urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
- When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to a point outside the clear zone.

If used to channelize pedestrians, longitudinal channelizing devices or water ballasted systems must have a continuous detectable bottom for users of long canes and the top of the unit shall not be less than 32 inches in height.

HOLLOW OR WATER BALLASTED SYSTEMS USED AS LONGITUDINAL CHANNELIZING DEVICES OR BARRIERS

GENERAL NOTES

- Work Zone channelizing devices illustrated on this sheet may be installed in close proximity to traffic and are suitable for use on high or low speed roadways. The Engineer/Inspector shall ensure that spacing and placement is uniform and in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
- Channelizing devices shown on this sheet may have a driveable, fixed or portable base. The requirement for self-righting channelizing devices must be specified in the General Notes or other plan sheets.
- Channelizing devices on self-righting supports should be used in work zone areas where channelizing devices are frequently impacted by errant vehicles or vehicle related wind gusts making alignment of the channelizing devices difficult to maintain. Locations of these devices shall be detailed elsewhere in the plans. These devices shall conform to the TMUTCD and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
- The Contractor shall maintain devices in a clean condition and replace damaged, nonreflective, faded, or broken devices and bases as required by the Engineer/Inspector. The Contractor shall be required to maintain proper device spacing and alignment.
- Portable bases shall be fabricated from virgin and/or recycled rubber. The portable bases shall weigh a minimum of 30 lbs.
- Pavement surfaces shall be prepared in a manner that ensures proper bonding between the adhesives, the fixed mount bases and the pavement surface. Adhesives shall be prepared and applied according to the manufacturer's recommendations.
- The installation and removal of channelizing devices shall not cause detrimental effects to the final pavement surfaces, including pavement surface discoloration or surface integrity. Driveable bases shall not be permitted on final pavement surfaces. The Engineer/Inspector shall approve all application and removal procedures of fixed bases.

Posted Speed	Formula	Minimum Desirable Taper Lengths * *			Suggested Maximum Spacing of Channelizing Devices	
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent
30	L = WS ² / 60	150'	165'	180'	30'	60'
35		205'	225'	245'	35'	70'
40		265'	295'	320'	40'	80'
45	L = WS	450'	495'	540'	45'	90'
50		500'	550'	600'	50'	100'
55		550'	605'	660'	55'	110'
60		600'	660'	720'	60'	120'
65		650'	715'	780'	65'	130'
70		700'	770'	840'	70'	140'
75		750'	825'	900'	75'	150'
80		800'	880'	960'	80'	160'

* * * Taper lengths have been rounded off.
L=Length of Taper (FT.) W=Width of Offset (FT.)
S=Posted Speed (MPH)

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12



BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (9) - 21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0205	02	067	US 79
9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	BRY	ROBERTSON	18	

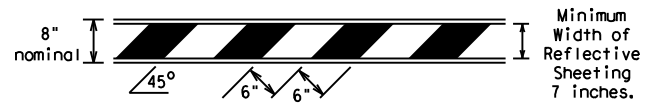
DATE: FILE:

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

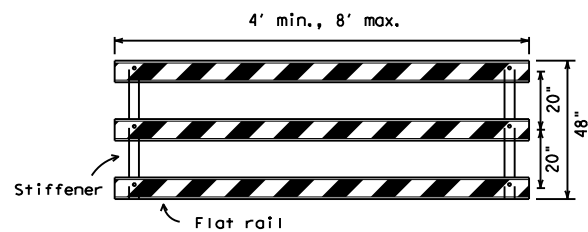
TYPE 3 BARRICADES

1. Refer to the Compliant Work Zone Traffic Control Devices List (CWZTCD) for details of the Type 3 Barricades and a list of all materials used in the construction of Type 3 Barricades.
2. Type 3 Barricades shall be used at each end of construction projects closed to all traffic.
3. Barricades extending across a roadway should have stripes that slope downward in the direction toward which traffic must turn in detouring. When both right and left turns are provided, the chevron striping may slope downward in both directions from the center of the barricade. Where no turns are provided at a closed road, striping should slope downward in both directions toward the center of roadway.
4. Striping of rails, for the right side of the roadway, should slope downward to the left. For the left side of the roadway, striping should slope downward to the right.
5. Identification markings may be shown only on the back of the barricade rails. The maximum height of letters and/or company logos used for identification shall be 1".
6. Barricades shall not be placed parallel to traffic unless an adequate clear zone is provided.
7. Warning lights shall NOT be installed on barricades.
8. Where barricades require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand is recommended. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight. Sand bags shall not be stacked in a manner that covers any portion of a barricade rails reflective sheeting. Rock, concrete, iron, steel or other solid objects will NOT be permitted. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall not be used for sandbags. Sandbags shall only be placed along or upon the base supports of the device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners.
9. Sheeting for barricades shall be retroreflective Type A or Type B conforming to Departmental Material Specification DMS-8300 unless otherwise noted.

Barricades shall NOT be used as a sign support.



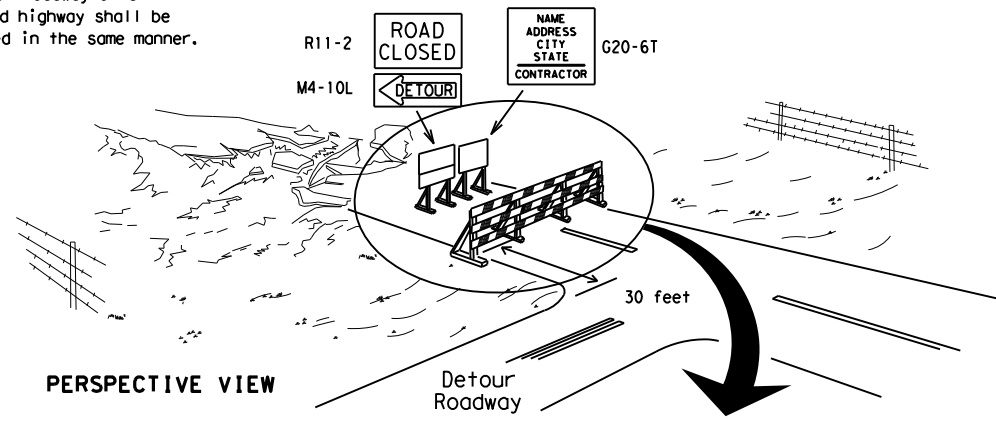
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



Stiffener may be inside or outside of support, but no more than 2 stiffeners shall be allowed on one barricade.

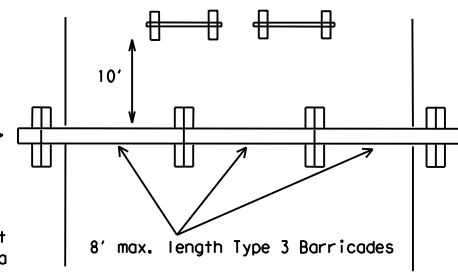
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

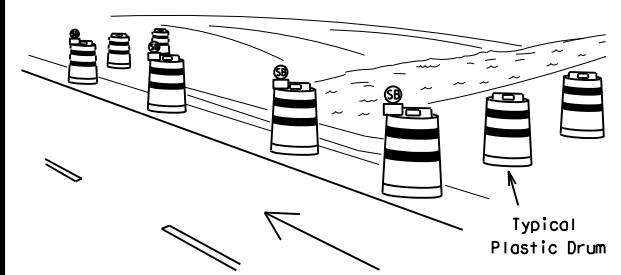
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic. Barricade striping should slant downward in the direction of detour.



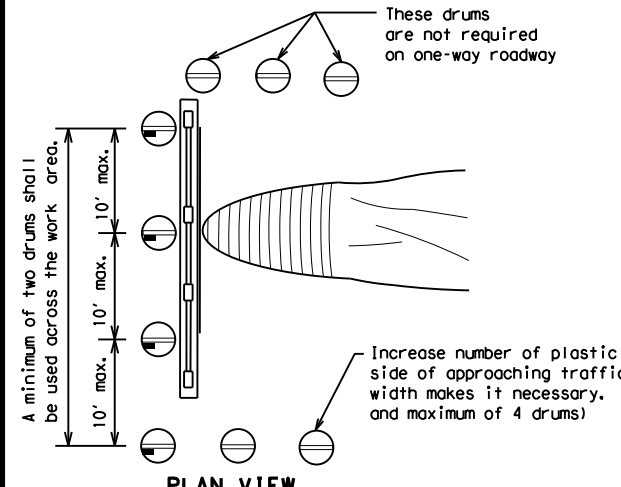
PLAN VIEW

1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

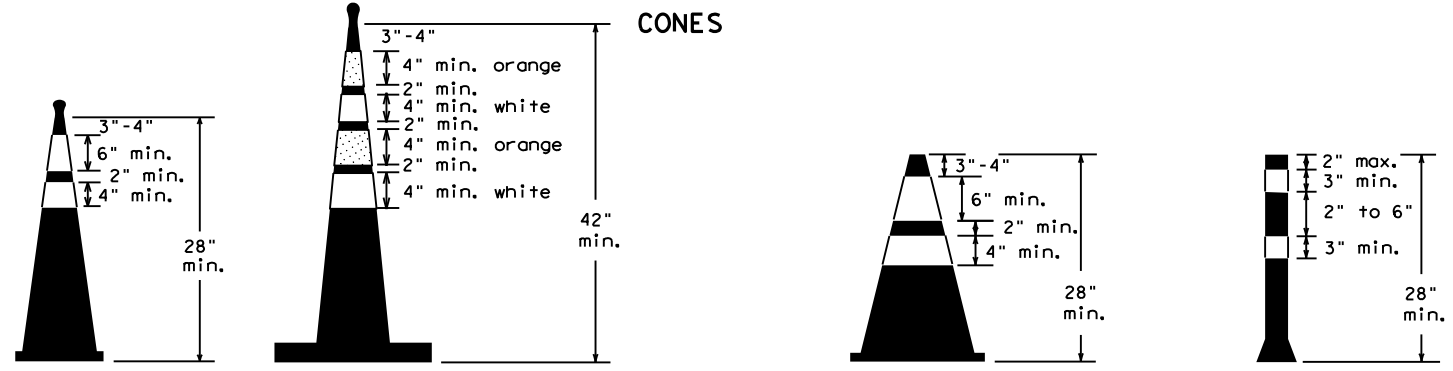


PLAN VIEW

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS

1. Where positive redirection capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder width is greater than 12 feet, steady-burn lights may be omitted if drums are used.
5. Drums must extend the length of the culvert widening.

LEGEND	
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
	Steady burn warning light or yellow warning reflector



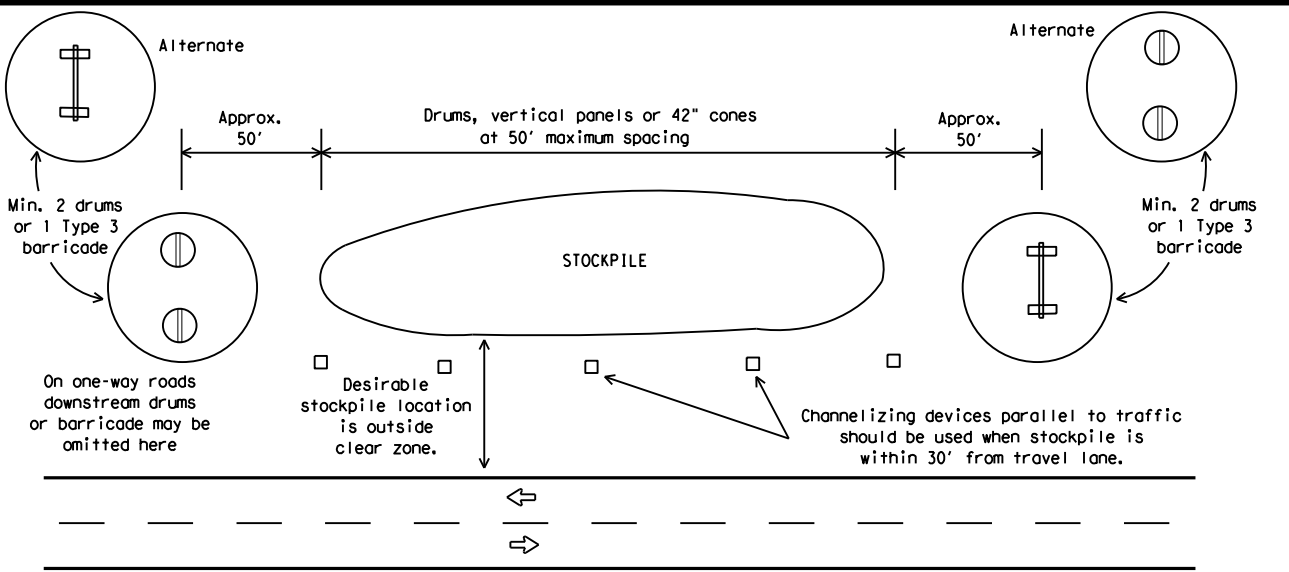
Two-Piece cones

One-Piece cones

Tubular Marker

28" Cones shall have a minimum weight of 9 1/2 lbs.
42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

1. Traffic cones and tubular markers shall be predominantly orange, and meet the height and weight requirements shown above.
2. One-piece cones have the body and base of the cone molded in one consolidated unit. Two-piece cones have a cone shaped body and a separate rubber base, or ballast, that is added to keep the device upright and in place.
3. Two-piece cones may have a handle or loop extending up to 8" above the minimum height shown, in order to aid in retrieving the device.
4. Cones or tubular markers shall have white or white and orange reflective bands as shown above. The reflective bands shall have a smooth, sealed outer surface and meet the requirements of Departmental Material Specification DMS-8300 Type A or Type B.
5. 28" cones and tubular markers are generally suitable for short duration and short-term stationary work as defined on BC(4). These should not be used for intermediate-term or long-term stationary work unless personnel is on-site to maintain them in their proper upright position.
6. 42" two-piece cones, vertical panels or drums are suitable for all work zone durations.
7. Cones or tubular markers used on each project should be of the same size and shape.



TRAFFIC CONTROL FOR MATERIAL STOCKPILES



BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (10) - 21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	OW: TxDOT	CR: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0205	02	067	US 79
9-07 8-14	DIST	COUNTY	SHEET NO.	
7-13 5-21	BRY	ROBERTSON	19	

DATE: FILE:

WORK ZONE PAVEMENT MARKINGS

GENERAL

- The Contractor shall be responsible for maintaining work zone and existing pavement markings, in accordance with the standard specifications and special provisions, on all roadways open to traffic within the CSJ limits unless otherwise stated in the plans.
- Color, patterns and dimensions shall be in conformance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
- Additional supplemental pavement marking details may be found in the plans or specifications.
- Pavement markings shall be installed in accordance with the TMUTCD and as shown on the plans.
- When short term markings are required on the plans, short term markings shall conform with the TMUTCD, the plans and details as shown on the Standard Plan Sheet WZ(STPM).
- When standard pavement markings are not in place and the roadway is opened to traffic, DO NOT PASS signs shall be erected to mark the beginning of the sections where passing is prohibited and PASS WITH CARE signs at the beginning of sections where passing is permitted.
- All work zone pavement markings shall be installed in accordance with Item 662, "Work Zone Pavement Markings."

RAISED PAVEMENT MARKERS

- Raised pavement markers are to be placed according to the patterns on BC(12).
- All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and Departmental Material Specification DMS-4200 or DMS-4300.

PREFABRICATED PAVEMENT MARKINGS

- Removable prefabricated pavement markings shall meet the requirements of DMS-8241.
- Non-removable prefabricated pavement markings (foil back) shall meet the requirements of DMS-8240.

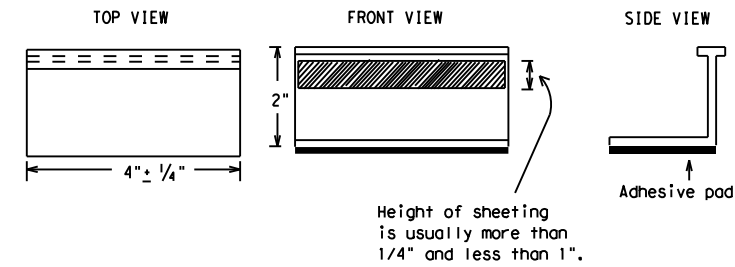
MAINTAINING WORK ZONE PAVEMENT MARKINGS

- The Contractor will be responsible for maintaining work zone pavement markings within the work limits.
- Work zone pavement markings shall be inspected in accordance with the frequency and reporting requirements of work zone traffic control device inspections as required by Form 599.
- The markings should provide a visible reference for a minimum distance of 300 feet during normal daylight hours and 160 feet when illuminated by automobile low-beam headlights at night, unless sight distance is restricted by roadway geometrics.
- Markings failing to meet this criteria within the first 30 days after placement shall be replaced at the expense of the Contractor as per Specification Item 662.

REMOVAL OF PAVEMENT MARKINGS

- Pavement markings that are no longer applicable, could create confusion or direct a motorist toward or into the closed portion of the roadway shall be removed or obliterated before the roadway is opened to traffic.
- The above shall not apply to detours in place for less than three days, where flaggers and/or sufficient channelizing devices are used in lieu of markings to outline the detour route.
- Pavement markings shall be removed to the fullest extent possible, so as not to leave a discernable marking. This shall be by any method approved by TxDOT Specification Item 677 for "Eliminating Existing Pavement Markings and Markers".
- The removal of pavement markings may require resurfacing or seal coating portions of the roadway as described in Item 677.
- Subject to the approval of the Engineer, any method that proves to be successful on a particular type pavement may be used.
- Blast cleaning may be used but will not be required unless specifically shown in the plans.
- Over-painting of the markings SHALL NOT BE permitted.
- Removal of raised pavement markers shall be as directed by the Engineer.
- Removal of existing pavement markings and markers will be paid for directly in accordance with Item 677, "ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS," unless otherwise stated in the plans.
- Black-out marking tape may be used to cover conflicting existing markings for periods less than two weeks when approved by the Engineer.

Temporary Flexible-Reflective Roadway Marker Tabs



**STAPLES OR NAILS SHALL NOT BE USED TO SECURE
TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER
TABS TO THE PAVEMENT SURFACE**

- Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of DMS-8242.
- Tabs detailed on this sheet are to be inspected and accepted by the Engineer or designated representative. Sampling and testing is not normally required, however at the option of the Engineer, either "A" or "B" below may be imposed to assure quality before placement on the roadway.
 - Select five (5) or more tabs at random from each lot or shipment and submit to the Construction Division, Materials and Pavement Section to determine specification compliance.
 - Select five (5) tabs and perform the following test. Affix five (5) tabs at 24 inch intervals on an asphaltic pavement in a straight line. Using a medium size passenger vehicle or pickup, run over the markers with the front and rear tires at a speed of 35 to 40 miles per hour, four (4) times in each direction. No more than one (1) out of the five (5) reflective surfaces shall be lost or displaced as a result of this test.
- Small design variances may be noted between tab manufacturers.
- See Standard Sheet WZ(STPM) for tab placement on new pavements. See Standard Sheet TCP(7-1) for tab placement on seal coat work.

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

- Raised pavement markers used as guidemarks shall be from the approved product list, and meet the requirements of DMS-4200.
- All temporary construction raised pavement markers provided on a project shall be of the same manufacturer.
- Adhesive for guidemarks shall be bituminous material hot applied or butyl rubber pad for all surfaces, or thermoplastic for concrete surfaces.

Guidemarks shall be designated as:
 YELLOW - (two amber reflective surfaces with yellow body).
 WHITE - (one silver reflective surface with white body).

DEPARTMENTAL MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
TRAFFIC BUTTONS	DMS-4300
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY REMOVABLE, PREFABRICATED PAVEMENT MARKINGS	DMS-8241
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS	DMS-8242

A list of prequalified reflective raised pavement markers, non-reflective traffic buttons, roadway marker tabs and other pavement markings can be found at the Material Producer List web address shown on BC(1).

SHEET 11 OF 12



BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0205	02	067	US 79
2-98 9-07 5-21	DIST	COUNTY	SHEET NO.	
1-02 7-13	BRY	ROBERTSON	20	
11-02 8-14				

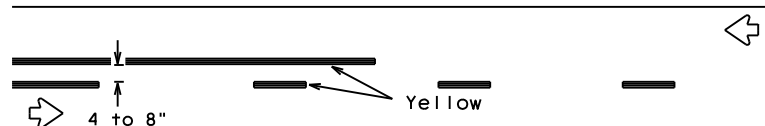
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:
FILE:

PAVEMENT MARKING PATTERNS

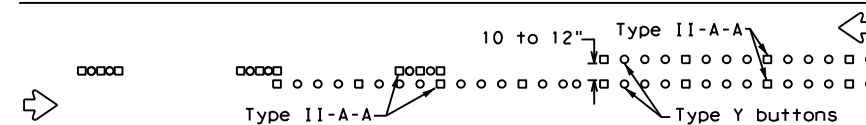


REFLECTORIZED PAVEMENT MARKINGS - PATTERN A

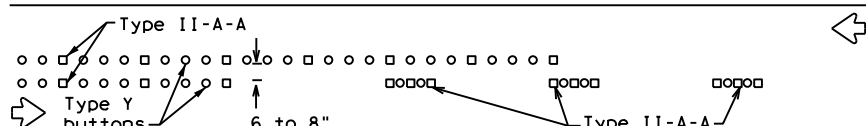


REFLECTORIZED PAVEMENT MARKINGS - PATTERN B

Pattern A is the TxDOT Standard, however Pattern B may be used if approved by the Engineer. Prefabricated markings may be substituted for reflectORIZED pavement markings.

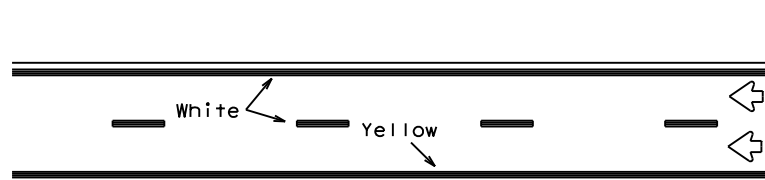


RAISED PAVEMENT MARKERS - PATTERN A



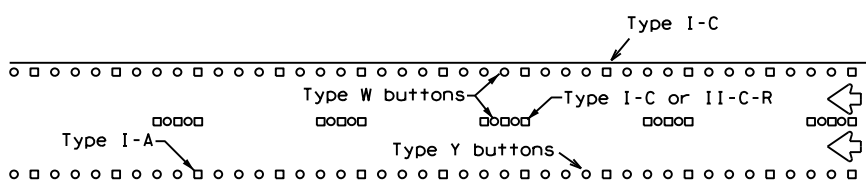
RAISED PAVEMENT MARKERS - PATTERN B

CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO-LANE, TWO-WAY HIGHWAYS



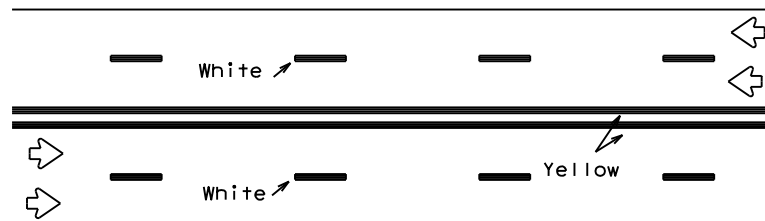
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



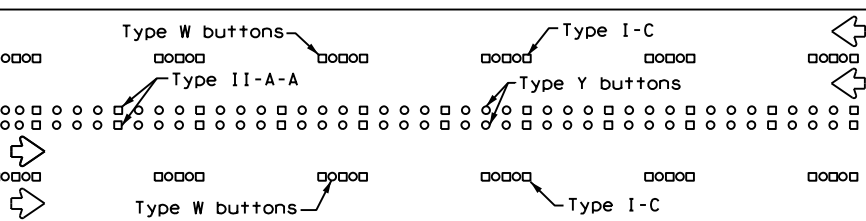
RAISED PAVEMENT MARKERS

EDGE & LANE LINES FOR DIVIDED HIGHWAY



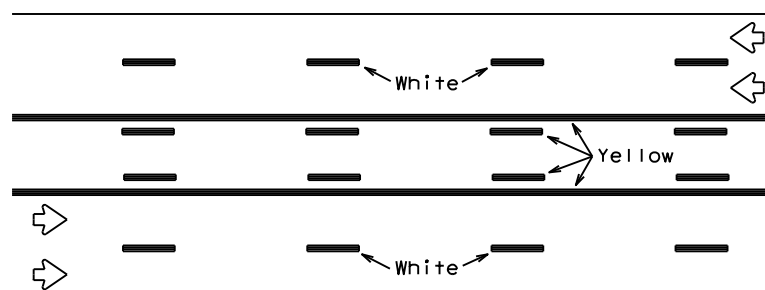
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



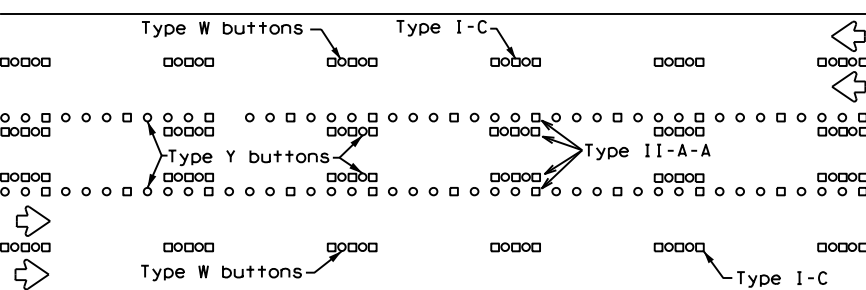
RAISED PAVEMENT MARKERS

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS

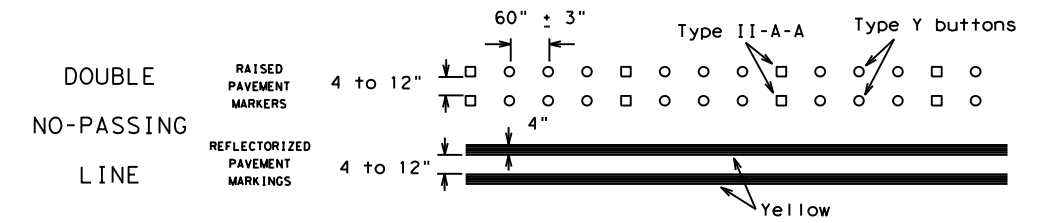
Prefabricated markings may be substituted for reflectORIZED pavement markings.



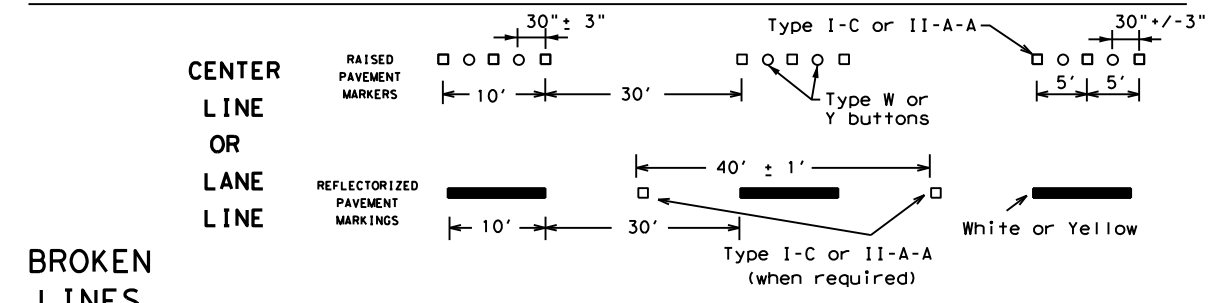
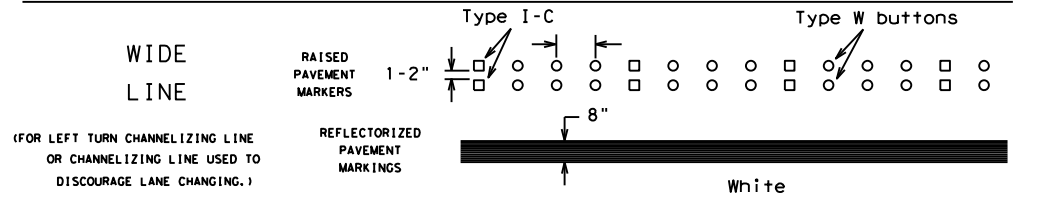
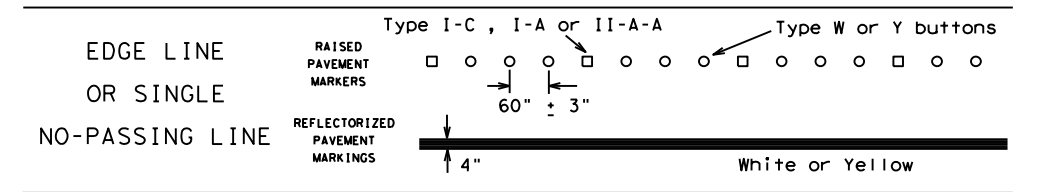
RAISED PAVEMENT MARKERS

TWO-WAY LEFT TURN LANE

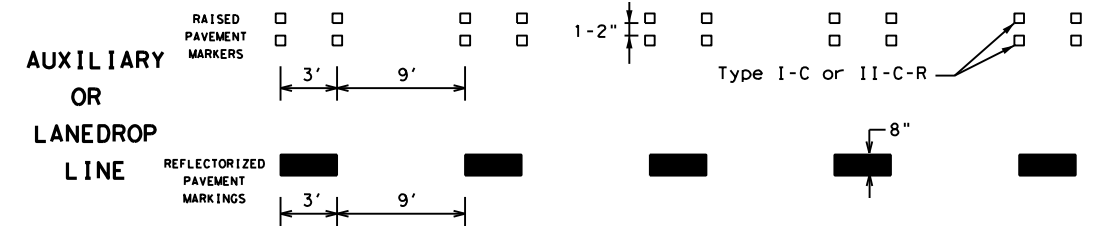
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



SOLID LINES

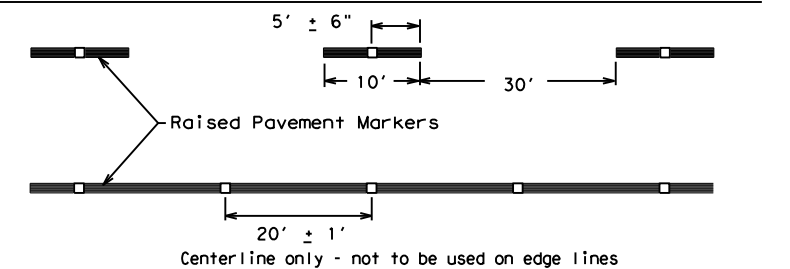


BROKEN LINES



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

If raised pavement markers are used to supplement REMOVABLE markings, the markers shall be applied to the top of the tape at the approximate mid length of tape used for broken lines or at 20 foot spacing for solid lines. This allows an easier removal of raised pavement markers and tape.



SHEET 12 OF 12



BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	OW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	0205	02	067	US 79
1-97 9-07 5-21				
2-98 7-13				
11-02 8-14	DIST	COUNTY	SHEET NO.	
	BRY	ROBERTSON	21	

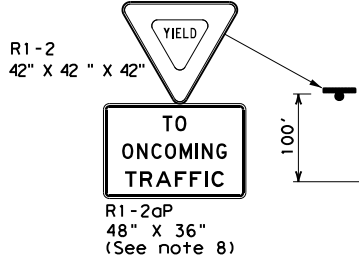
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: FILE:

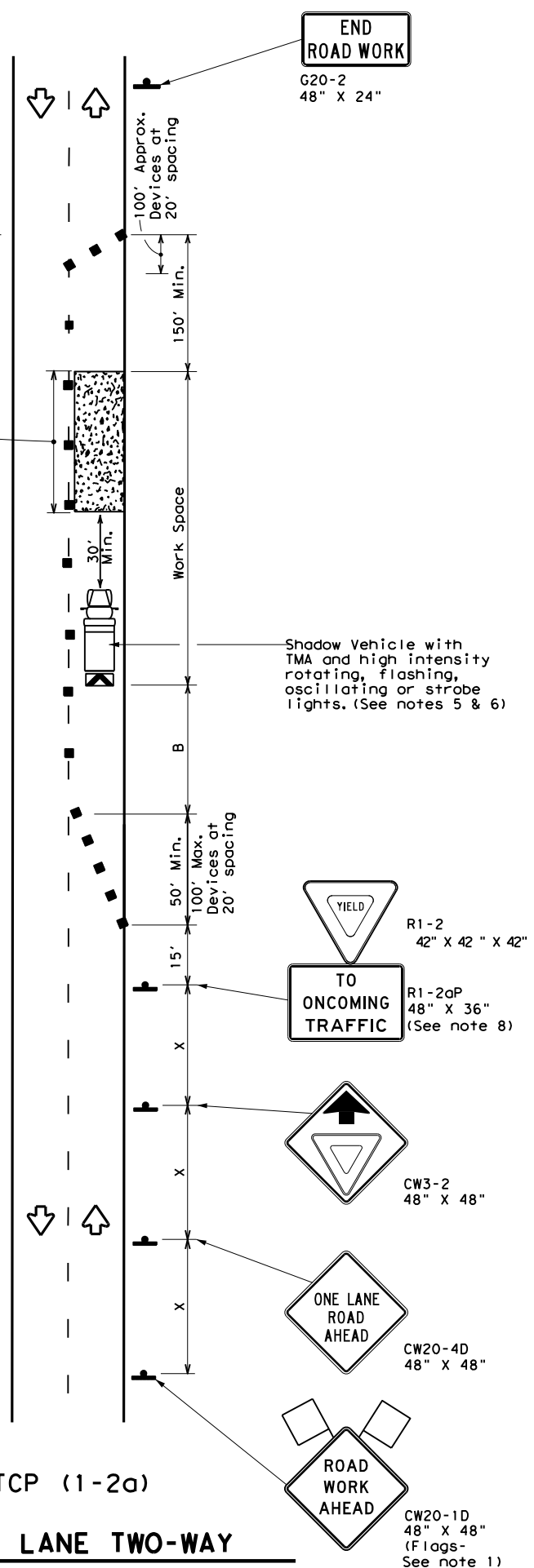
DATE: 8/25/2021 9:20:14 AM
 FILE: \\txdot.projectwiseonline.com\TXDOT14\Documents\17 - BRY\Design Projects\17-090909\17-090909.dgn

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to any other format or for any errors or omissions that may appear hereon.

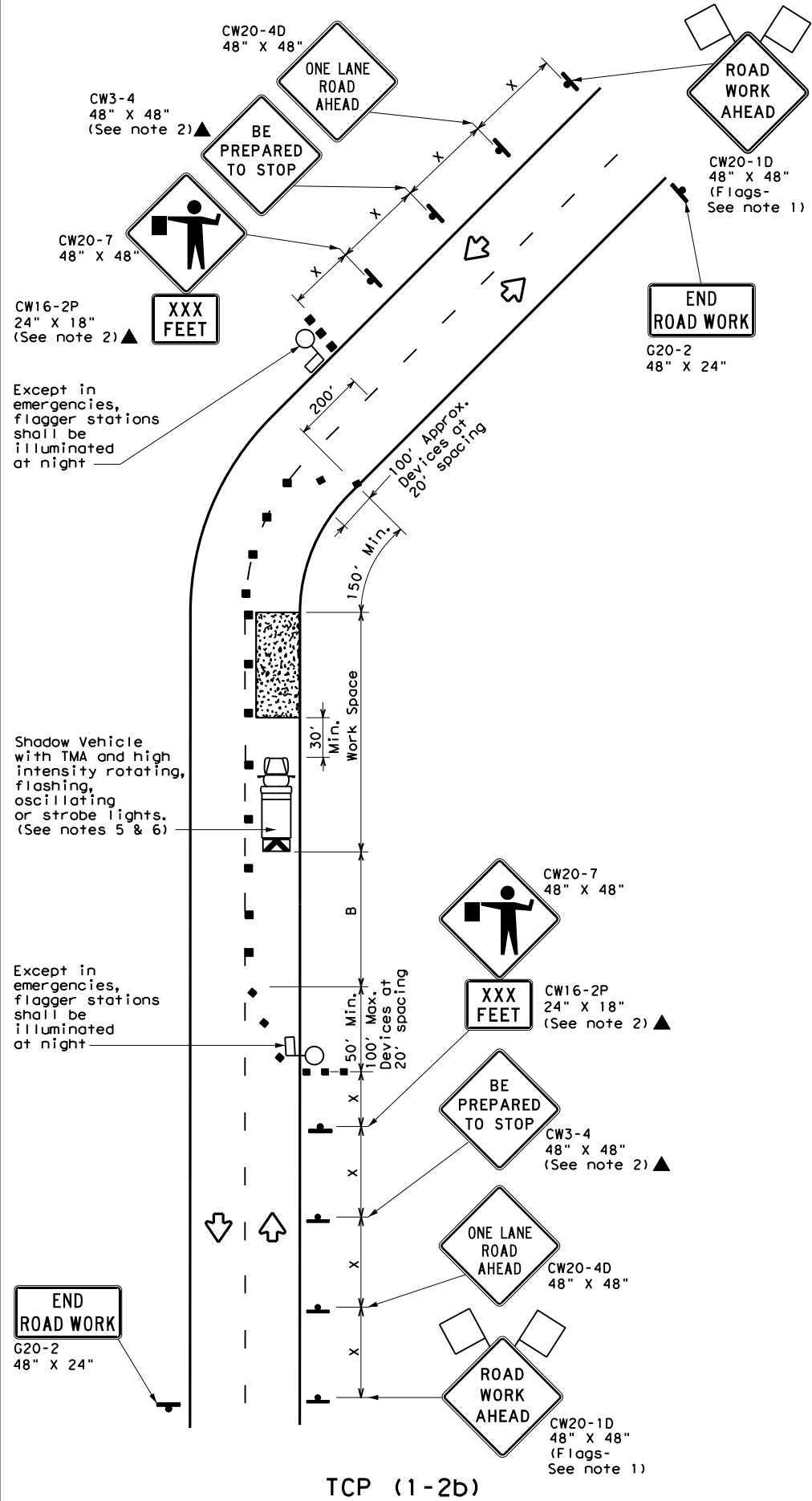
Warning Sign Sequence in Opposite Direction Same as Below



Channelizing devices separate work space from traveled way



TCP (1-2a)
ONE LANE TWO-WAY CONTROL WITH YIELD SIGNS
 (Less than 2000 ADT - See note 7)



TCP (1-2b)
ONE LANE TWO-WAY CONTROL WITH FLAGGERS

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed * X	Formula L = WS ² / 60	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent			
30		150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L = WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

* Conventional Roads Only
 ** Taper lengths have been rounded off.
 L=Length of Taper (FT) W=Width of Offset (FT) S=Posted Speed (MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

GENERAL NOTES

- Flags attached to signs where shown are REQUIRED.
- All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
- The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4D "ONE LANE ROAD AHEAD" sign, but proper sign spacing shall be maintained.
- Sign spacing may be increased or an additional CW20-1D "ROAD WORK AHEAD" sign may be used if advance warning ahead of the flagger or R1-2 "YIELD" sign is less than 150 feet.
- A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
- Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

TCP (1-2a)

- R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work spaces should be no longer than one half city block. In rural areas on roadways with less than 2000 ADT, work spaces should be no longer than 400 feet.
- R1-2 "YIELD" sign with R1-2aP "TO ONCOMING TRAFFIC" plaque shall be placed on a support at a 7 foot minimum mounting height.

TCP (1-2b)

- Flaggers should use two-way radios or other methods of communication to control traffic.
- Length of work space should be based on the ability of flaggers to communicate.
- If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain adequate stopping sight distance to the flagger and a queue of stopped vehicles (see table above).
- Channelizing devices on the center-line may be omitted when a pilot car is leading traffic and approved by the Engineer.
- Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situations.

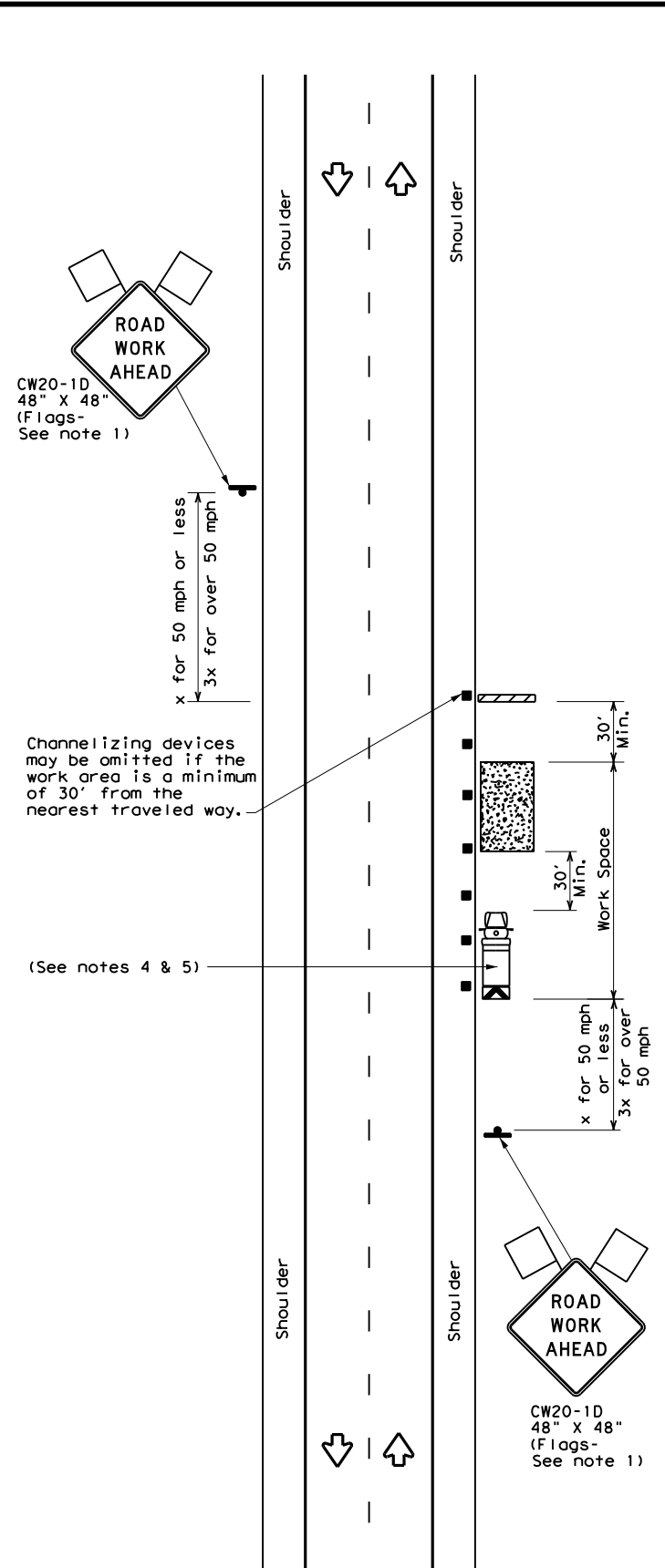
Texas Department of Transportation Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY
TRAFFIC CONTROL

TCP (1-2) - 18

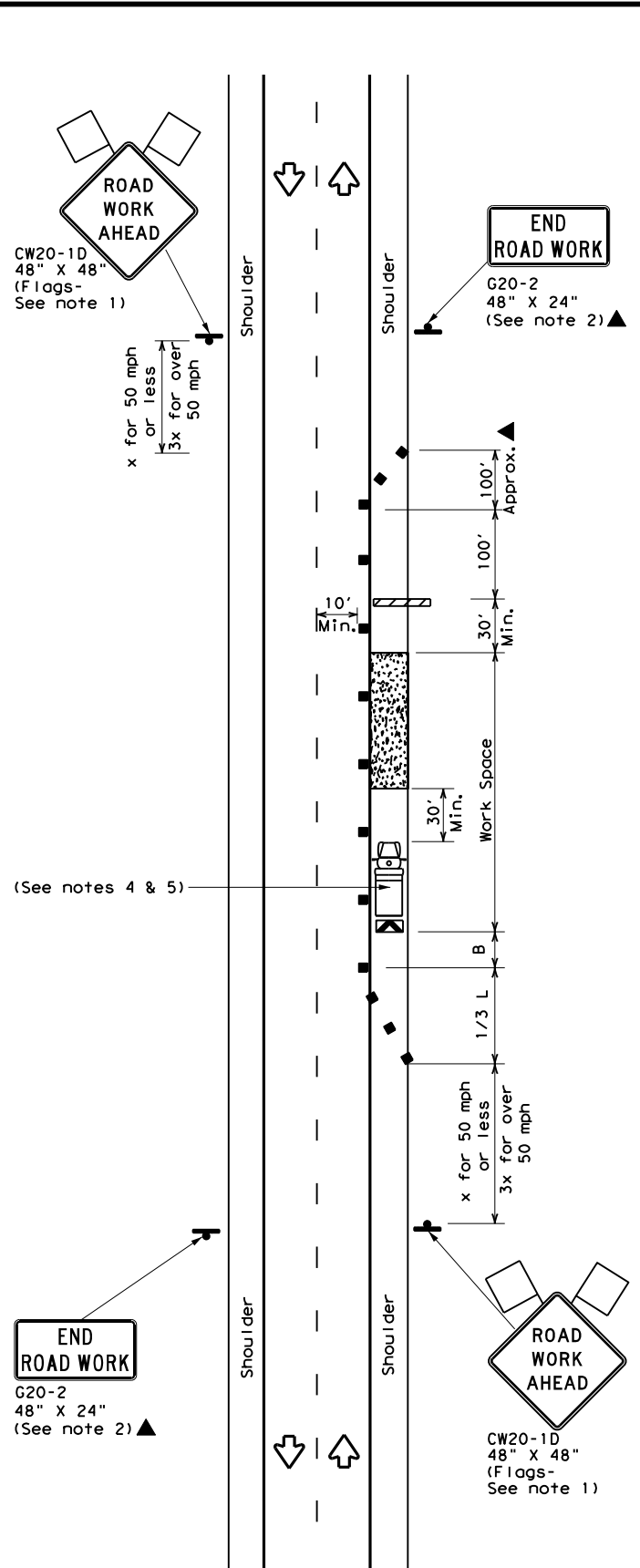
FILE: tcp1-2-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0205	02	067	US 79
4-90 4-98	DIST	COUNTY	SHEET NO.	
2-94 2-12	BRY	ROBERTSON	23	
1-97 2-18				

DATE: 8/25/2021 9:20:25 AM
 FILE: \\txdot.projectwiseonline.com:TXDOT4\Documents\17 - BRY\Design Projects\02050206\02050206.dgn
 DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to any other format or for any errors or omissions that may appear hereon.



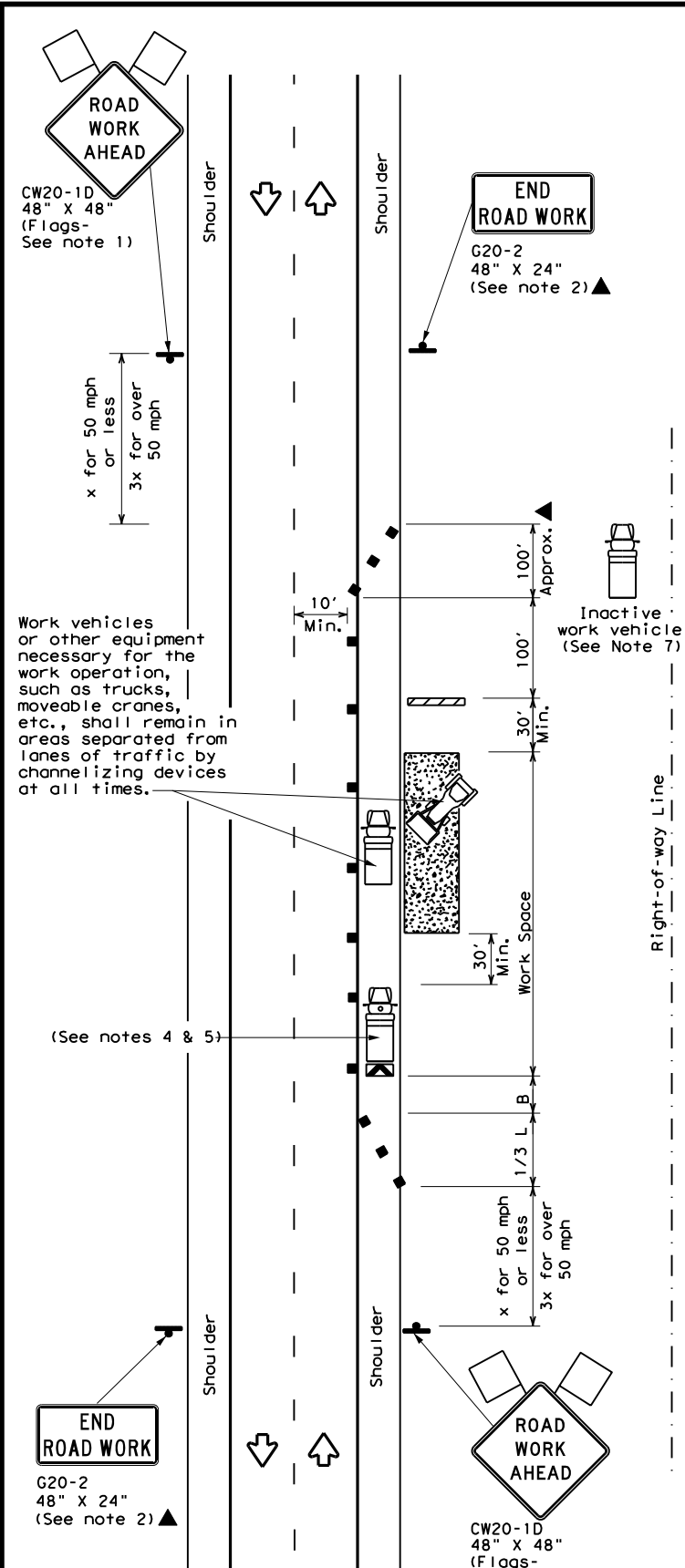
TCP (2-1a)

WORK SPACE NEAR SHOULDER
 Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
 Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
 Conventional Roads

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L = WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70	700'	770'	840'	70'	140'	800'	475'	
75	750'	825'	900'	75'	150'	900'	540'	

* Conventional Roads Only
 ** Taper lengths have been rounded off.
 L=Length of Taper (FT) W=Width of Offset (FT) S=Posted Speed (MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓	✓	✓

GENERAL NOTES

- Flags attached to signs where shown, are REQUIRED.
- All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated in the plans, or for routine maintenance work, when approved by the Engineer.
- Stockpiled material should be placed a minimum of 30 feet from nearest traveled way.
- Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
- Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.
- See TCP(5-1) for shoulder work on divided highways, expressways and freeways.
- Additional work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
- CW21-5 "SHOULDER WORK" signs may be used in place of CW20-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

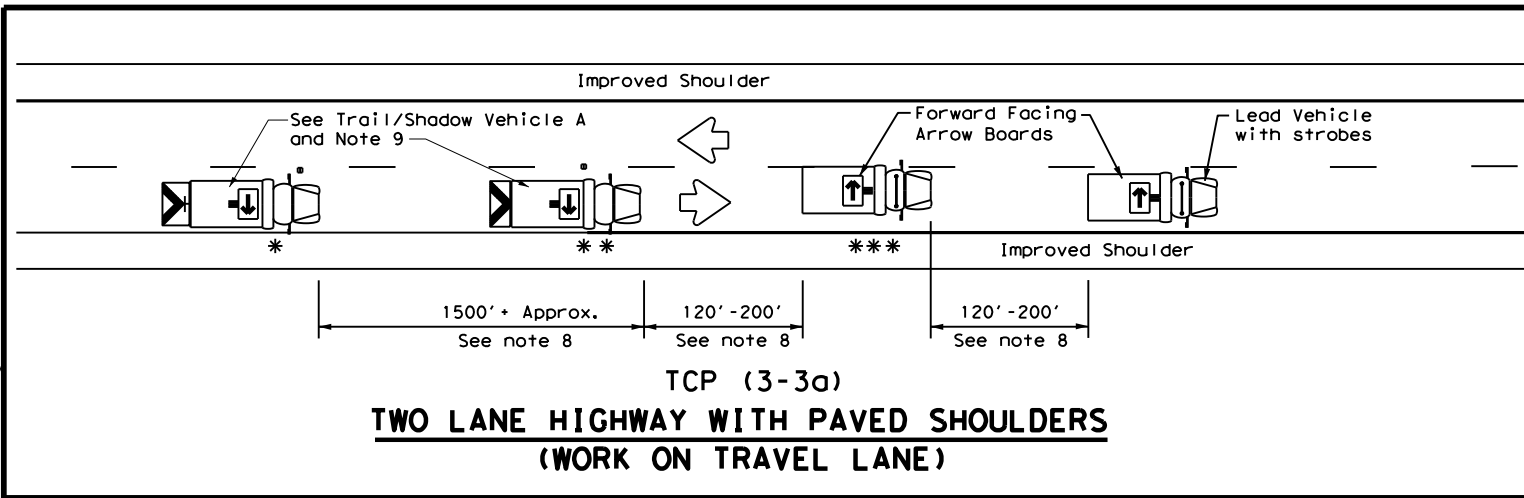


TRAFFIC CONTROL PLAN
CONVENTIONAL ROAD
SHOULDER WORK

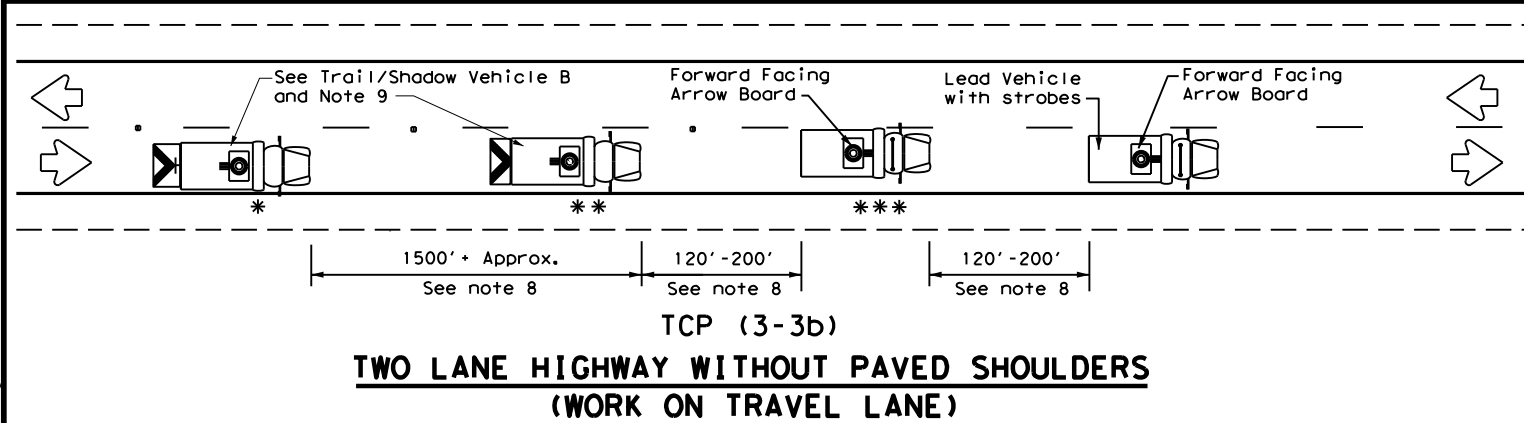
TCP (2-1) - 18

FILE: tcp2-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0205	02	067	US 79
2-94 4-98	DIST	COUNTY	SHEET NO.	
8-95 2-12	BRY	ROBERTSON	25	
1-97 2-18				

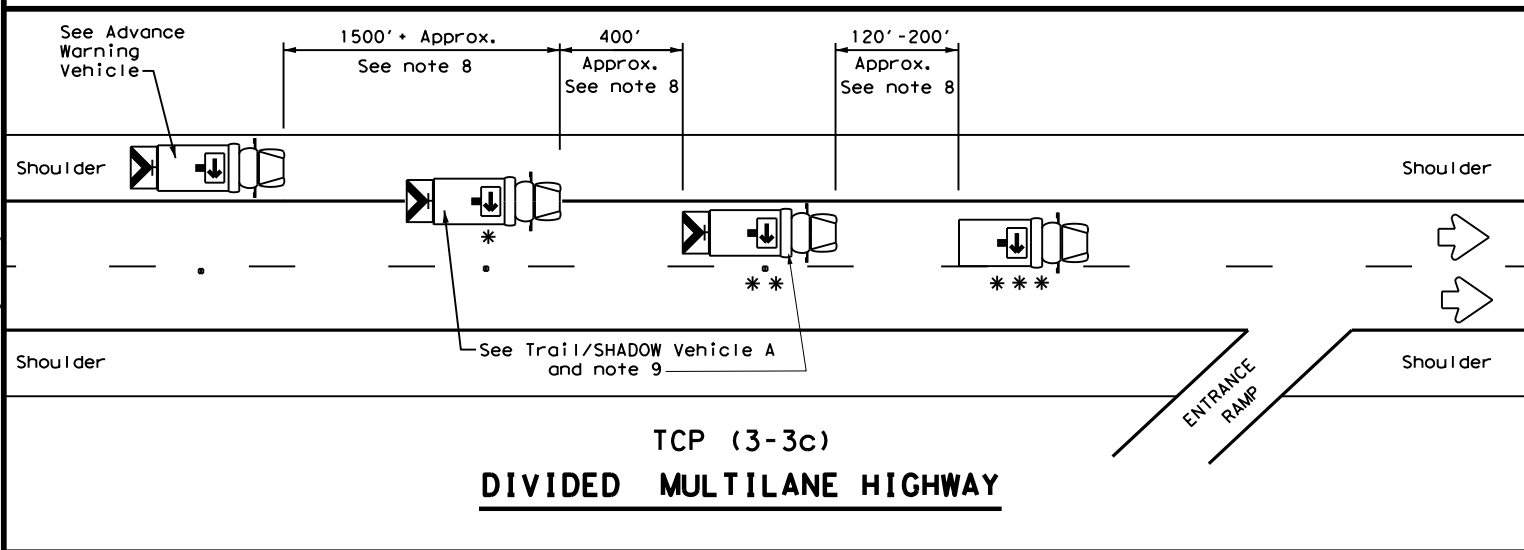
DATE: 8/25/2021 9:20:48 AM
 FILE: \\txdot\project\wiseonline.com\TXDOT4\Documents\17 - BRY\Design Projects\17080808\17080808.dgn
 The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to any other format or for any errors or omissions that may appear hereon.



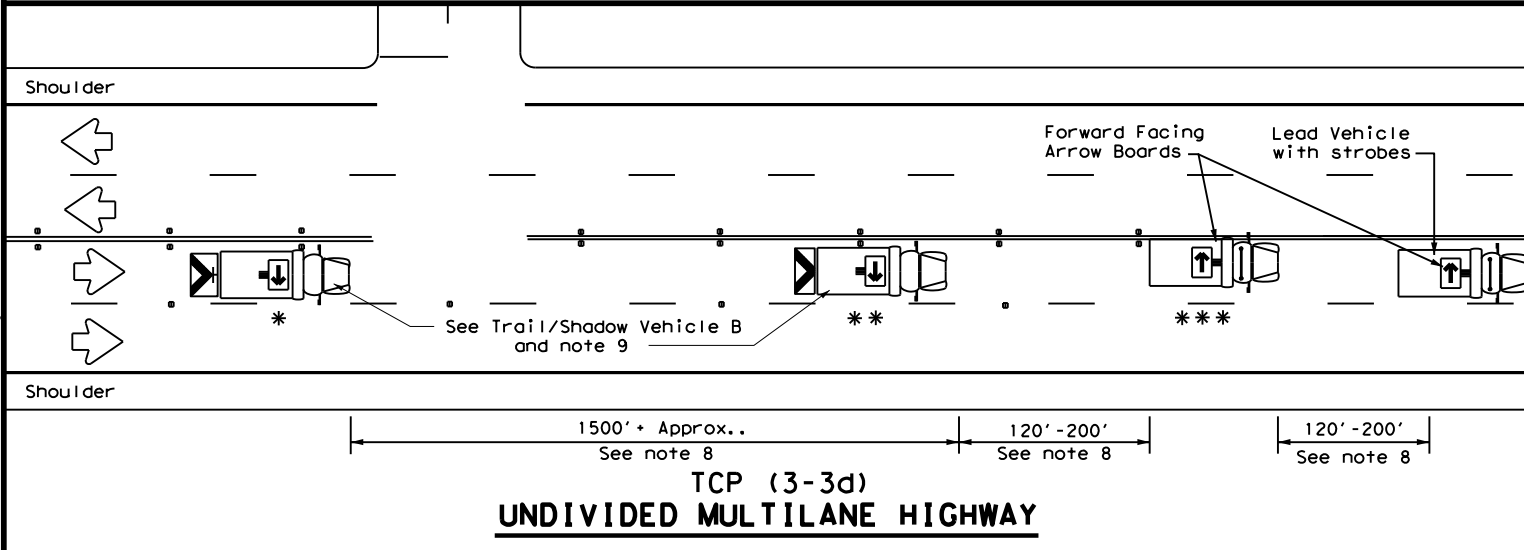
TCP (3-3a)
TWO LANE HIGHWAY WITH PAVED SHOULDERS
(WORK ON TRAVEL LANE)



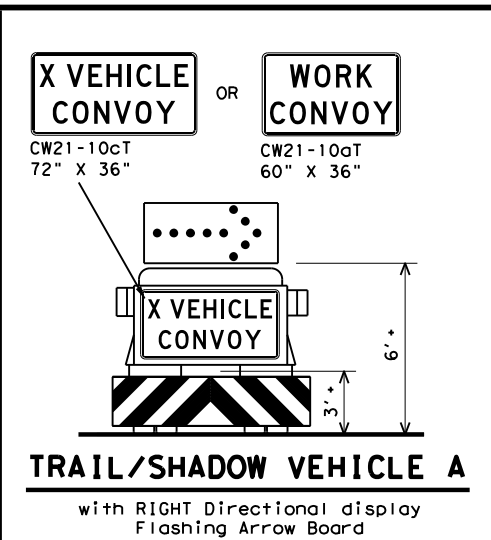
TCP (3-3b)
TWO LANE HIGHWAY WITHOUT PAVED SHOULDERS
(WORK ON TRAVEL LANE)



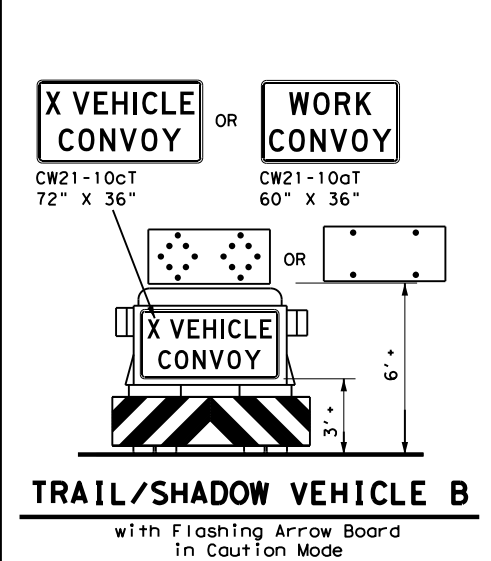
TCP (3-3c)
DIVIDED MULTILANE HIGHWAY



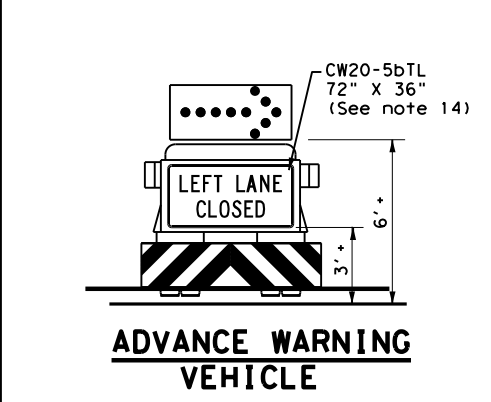
TCP (3-3d)
UNDIVIDED MULTILANE HIGHWAY



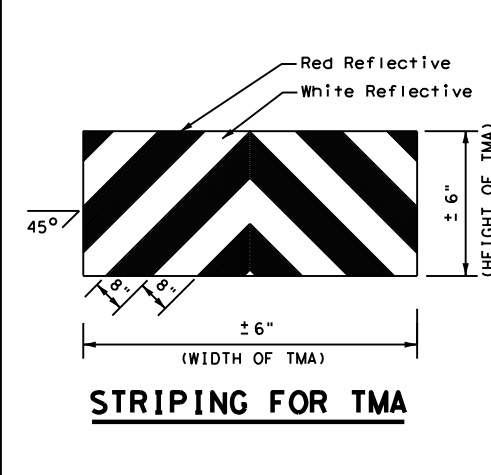
TRAIL/SHADOW VEHICLE A
 with RIGHT Directional display
 Flashing Arrow Board



TRAIL/SHADOW VEHICLE B
 with Flashing Arrow Board
 in Caution Mode



ADVANCE WARNING VEHICLE



STRIPING FOR TMA

LEGEND		
* Trail Vehicle	ARROW BOARD DISPLAY	
** Shadow Vehicle		
*** Work Vehicle		RIGHT Directional
		LEFT Directional
		Double Arrow
		CAUTION (Alternating Diamond or 4 Corner Flash)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
✓				

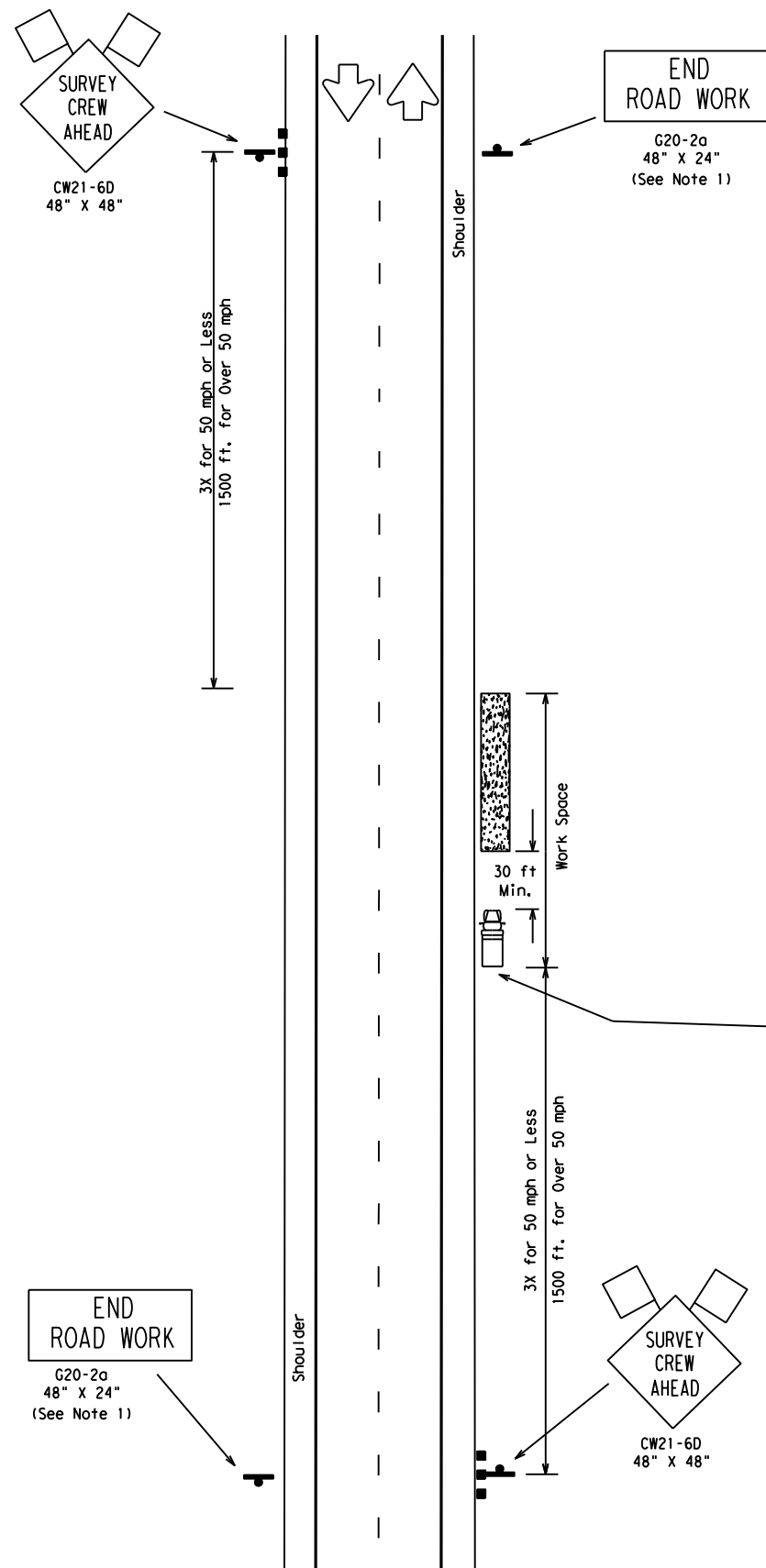
GENERAL NOTES

- TRAIL, SHADOW, and LEAD vehicles shall be equipped with arrow boards as illustrated. When a LEAD vehicle is not used on two way roads the WORK vehicle must have an arrow board. For divided roadways, the arrow board on the WORK vehicle is optional based on the type of work being performed. The Engineer will determine if the LEAD vehicle and/or TRAIL vehicle are required based on prevailing roadway conditions, traffic volume, and sight distance restrictions.
- The use of amber high intensity rotating, flashing, oscillating, or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating, or strobe lights when mounted on the driver's side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
- The use of truck mounted attenuators (TMA) on the SHADOW VEHICLE, ADVANCE WARNING and TRAIL VEHICLE are required.
- Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DEPARTMENTAL MATERIAL SPECIFICATION DMS 8300, Type A.
- Flashing arrow boards shall be Type B or Type C as per the Barricade and Construction (BC) standards. The board shall be controlled from inside the vehicle.
- Each vehicle shall have two-way radio communication capability.
- When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
- Vehicle spacing between the TRAIL VEHICLE and the SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE. Vehicle spacing between the WORK VEHICLE and SHADOW VEHICLE and vehicle spacing between WORK VEHICLE and LEAD VEHICLE may vary according to terrain, work activity and other factors.
- X VEHICLE CONVOY (CW21-10cT) or WORK CONVOY (CW21-10aT) signs shall be used on TRAIL VEHICLES and SHADOW VEHICLES as shown. As an option 48" x 48" diamond shaped WORK CONVOY (CW21-10T) or X VEHICLE CONVOY (CW21-10bT) signs may be used where adequate mounting space exists. When used, the X VEHICLE CONVOY sign shall have the number of the convoy vehicles displayed on the sign in the number designation "X" location. The X VEHICLE CONVOY sign shall not be used on the SHADOW VEHICLE if a TRAIL VEHICLE is used.
- For divided highways with two or three lanes in one direction, the appropriate LEFT LANE CLOSED (CW20-5bTL), RIGHT LANE CLOSED (CW20-5bTR), or CENTER LANE CLOSED (CW20-5dT) sign should be used on the Advance Warning Vehicle. As an option, a portable changeable message sign (PCMS) or truck mounted changeable message sign (TMCMS) with a minimum character height of 12", and displaying the same legend may be substituted for these signs. An appropriate directional arrow display, simulating the size and legibility of the flashing arrow board may be used in the second phase of the PCMS/TMCMS message. When this is done, the arrow board will not be required on the Advance Warning Vehicle.
- A double arrow shall not be displayed on the arrow board on the Advance Warning Vehicle.
- For divided highways with three or four lanes in each direction, use TCP(3-2).
- Standard diamond shape versions of the CW20-5 series signs may be used as an option if the rectangular signs shown are not available.
- The Advance Warning Vehicle may straddle the edgeline when Shoulder width makes it necessary.
- On two-lane two-way roadways, the work and protection vehicles should pull over periodically to allow motor vehicle traffic to pass. If motorists are not allowed to pass the work convoy, a DO NOT PASS (R4-1) sign should be placed on the back of the rearmost protection vehicle.

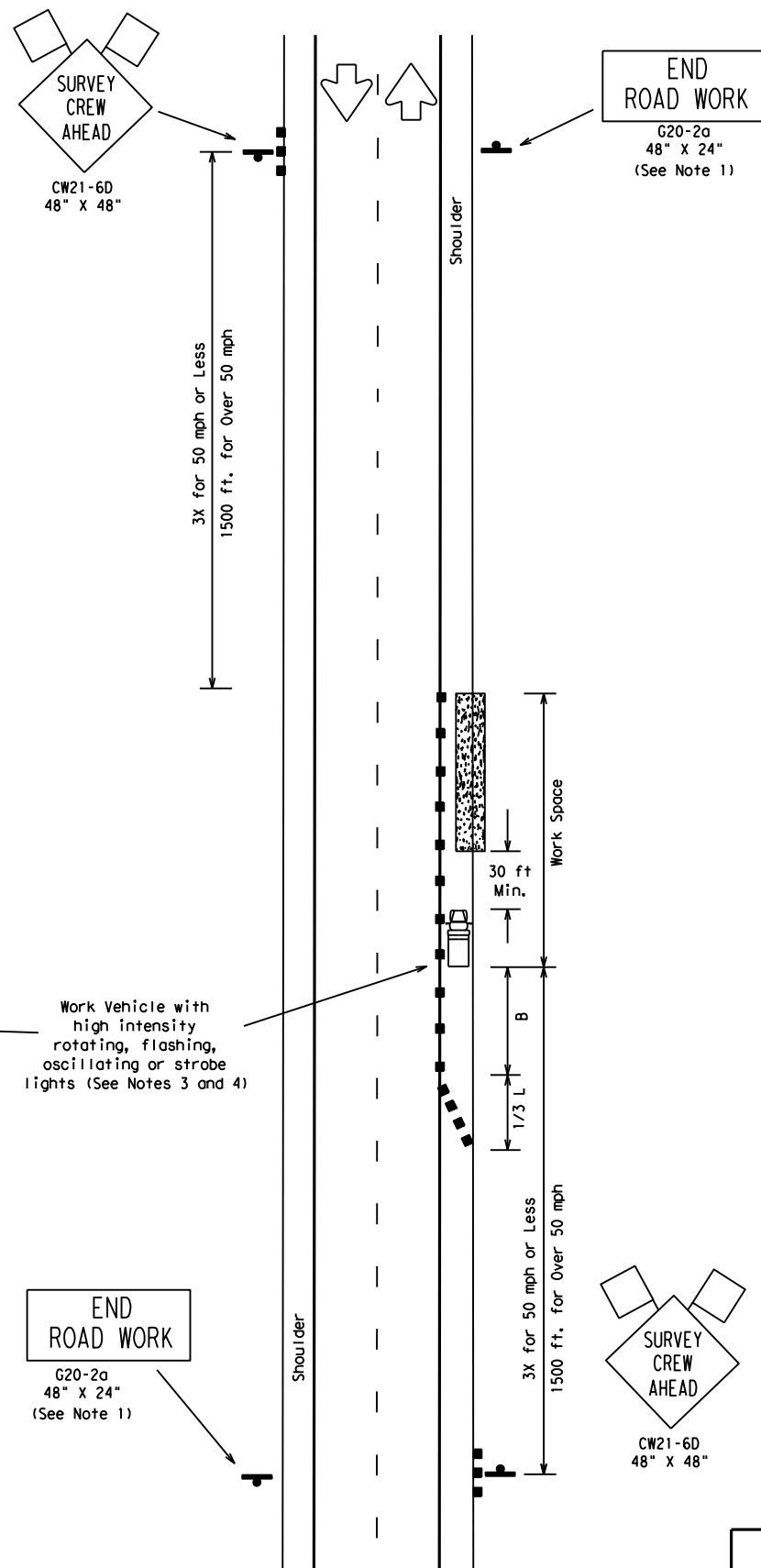
 Texas Department of Transportation		Traffic Operations Division Standard
TRAFFIC CONTROL PLAN MOBILE OPERATIONS RAISED PAVEMENT MARKER INSTALLATION/ REMOVAL TCP (3-3) - 14		
FILE: tcp3-3.dgn © TxDOT September 1987	DWS: TxDOT CONT: 0205 REVISIONS: 02 2-94 4-98 8-95 7-13 1-97 7-14	JOB: 067 COUNTY: ROBERTSON HIGHWAY: US 79 SHEET NO.: 29

DATE: 8/25/2021 9:20:54 AM
 FILE: \\txdot.projectwiseonline.com:TXDOT14\Documents\17 - BRY\Design Projects\020502067\4 - Design\Plan Set\2 - TCP\2B - TCP Standards\tcps1.dgn

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



TCP (S-1a)
 WORK OFF SHOULDER
 OR PAVED SURFACE



TCP (S-1b)
 WORK ON SHOULDER

WHENEVER POSSIBLE, SURVEY PARTIES SHOULD AVOID, BY THE USE OF OFFSET LINES, ANY UNNECESSARY PERIODS OF TIME ON THE ROAD SURFACE.

8-18-08 Revision
 Corrected misspelling.

LEGEND

	Type III Barricade		Channelizing Devices		Flag
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)		
	Trailer Mounted Flashing Arrow Panel		Portable Changeable Message Sign (PCMS)		
	Flagger		Sign Post		

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Device		Min. Sign Spacing "X" Distance	Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60' - 75'	120'	90'
35		205'	225'	245'	35'	70' - 90'	160'	120'
40		265'	295'	320'	40'	80' - 100'	240'	155'
45		450'	495'	540'	45'	90' - 110'	320'	195'
50		500'	550'	600'	50'	100' - 125'	400'	240'
55		550'	605'	660'	55'	110' - 140'	500'	295'
60		600'	660'	720'	60'	120' - 150'	600'	350'
65	650'	715'	780'	65'	130' - 165'	700'	410'	
70	700'	770'	840'	70'	140' - 175'	800'	475'	
75	750'	825'	900'	75'	150' - 185'	900'	540'	

* Conventional Roads Only
 ** Taper lengths have been rounded off.
 L=Length of Taper (FT.) W=Width of Offset (FT.) S=Posted Speed (MPH)

TYPICAL USAGE:

MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

DEFINITIONS:
 SHORT DURATION - work that occupies a location up to 1 hour.
 SHORT TERM STATIONARY - daytime work that occupies a location for more than 1 hour within a single daylight period.

- GENERAL NOTES:
- The G20-2a "END ROAD WORK" sign may be placed on the back of the CW21-6D "SURVEY CREW AHEAD" sign or may be omitted for short duration (less than 1 hour) work.
 - Channelizing devices on the shoulder taper and tangent section may be omitted for short duration (less than 1 hour) work.
 - If line-of-sight requirements for surveying operations will preclude the placement of the Work Vehicle to protect workers, the channelizing devices mentioned in Note 2 are required.
 - A Shadow Vehicle with a Truck Mounted Attenuator and flashing warning lights/arrow panel in caution mode may be used in lieu of the Work Vehicle to protect the work space.
 - The CW20-1D "ROAD WORK AHEAD" sign may be substituted for the CW21-6D "SURVEY CREW AHEAD" sign.
 - This plan may also be used for shoulder work or off shoulder work for multilane undivided roadways.
 - The CW21-6D "SURVEY CREW AHEAD" sign for low volume intersecting side roads is desirable, but is not required when working less than 15 minutes in area of the side road, as determined by the Engineer.

TCP (S-1a)
 8. Cones may be placed at edge of pavement adjacent to the work space to enhance safety.

Texas Department of Transportation
 Traffic Operations Division

TRAFFIC CONTROL PLAN FOR SURVEYING OPERATIONS

TCP (S-1) - 08A

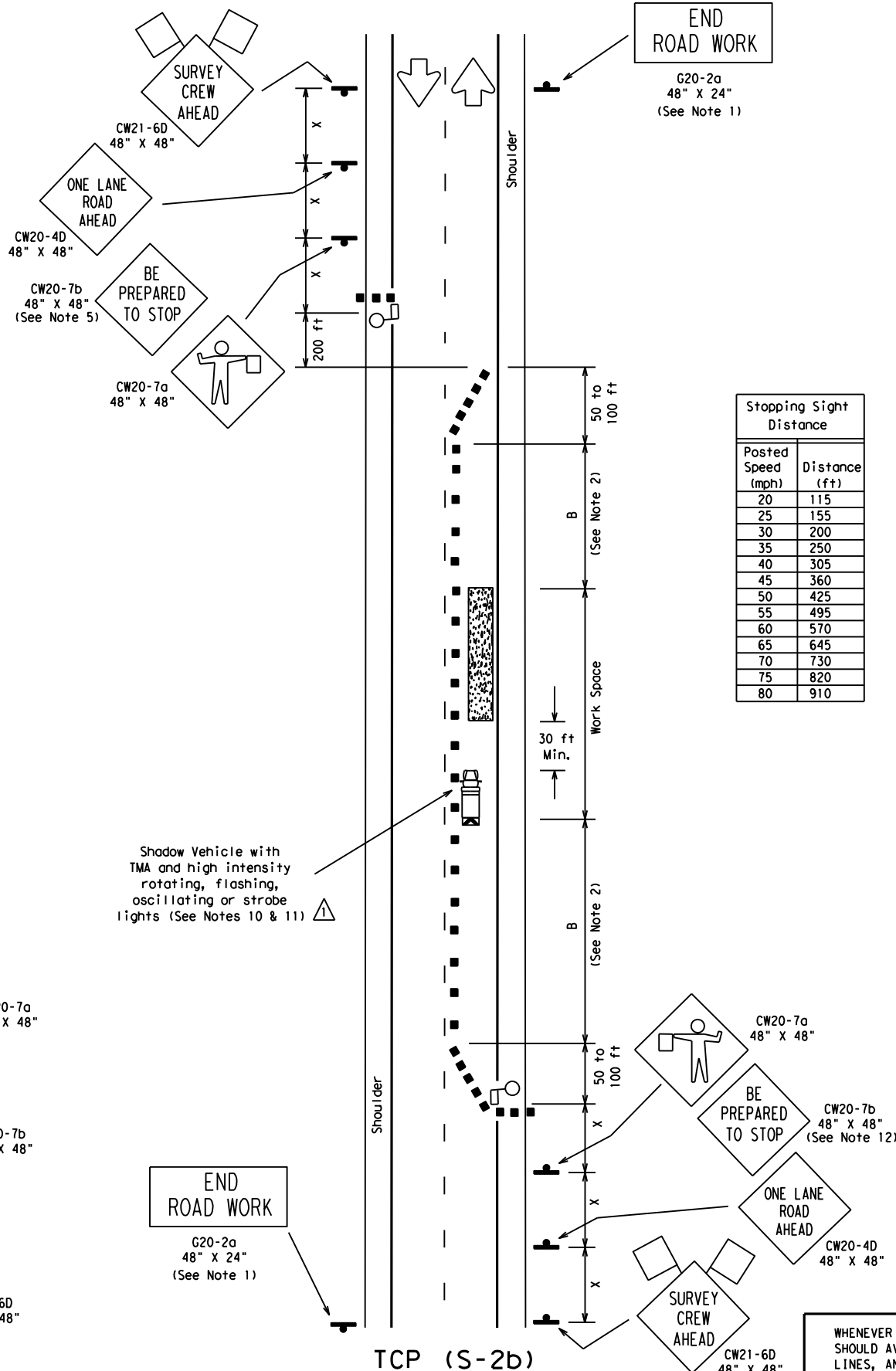
© TxDOT August 2008		DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
8-08	REVISIONS	CONT	SECT	JOB	HIGHWAY
		0205	02	067	US 79
		DIST	COUNTY	SHEET NO.	
		BRY	ROBERTSON	30	

DATE: 8/25/2021 9:20:59 AM
 FILE: \\txdot.projectwiseonline.com\BRY\Design Projects\020502067\4 - Design\Plan Set\2 - TCP\2B - TCP\2B - TCP\2B.dgn

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



TCP (S-2a)
 ROAD CLOSED FOR LESS THAN 20 MINUTES -
 OFF PEAK TRAFFIC HOURS
 WITH OR WITHOUT SHOULDERS



TCP (S-2b)
 WORK IN ROADWAY
 OFF PEAK TRAFFIC HOURS
 WITH OR WITHOUT SHOULDERS

Posted Speed (mph)	Distance (ft)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820
80	910

LEGEND

- Type III Barricade
- Channelizing Devices
- Flag
- Heavy Work Vehicle
- Truck Mounted Attenuator (TMA)
- Trailer Mounted Flashing Arrow Panel
- Portable Changeable Message Sign (PCMS)
- Flagger
- Sign Post

Posted Speed \times	Formula	Minimum Desirable Taper Lengths \times			Suggested Maximum Spacing of Device		Min. Sign Spacing "x" Distance	Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60' - 75'	120'	90'
35		205'	225'	245'	35'	70' - 90'	160'	120'
40		265'	295'	320'	40'	80' - 100'	240'	155'
45		450'	495'	540'	45'	90' - 110'	320'	195'
50		500'	550'	600'	50'	100' - 125'	400'	240'
55	$L = WS$	550'	605'	660'	55'	110' - 140'	500'	295'
60		600'	660'	720'	60'	120' - 150'	600'	350'
65		650'	715'	780'	65'	130' - 165'	700'	410'
70		700'	770'	840'	70'	140' - 175'	800'	475'
75		750'	825'	900'	75'	150' - 185'	900'	540'

* Conventional Roads Only
 ** Taper lengths have been rounded off.
 L=Length of Taper (FT.) W=Width of Offset (FT.) S=Posted Speed (MPH)

TYPICAL USAGE:				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

DEFINITIONS:
 SHORT DURATION - work that occupies a location up to 1 hour.
 SHORT TERM STATIONARY - daytime work that occupies a location for more than 1 hour within a single daylight period.

- GENERAL NOTES:
- The G20-2a "END ROAD WORK" sign may be placed on the back of the CW21-6D "SURVEY CREW AHEAD" sign or may be omitted for short duration (less than 1 hour) work.
 - Adequate Stopping Sight Distance (see Stopping Sight Distance table) should be maintained from approaching traffic to the flagger or a queue of stopped vehicles. The Buffer Space "B" should be extended around curves or other obstacles, when necessary, to have adequate Stopping Sight Distance to the flagger station.
 - Flaggers should use two-way radios or other means of communication while flagging.
 - The length of the work space should be based on the ability of the flaggers to communicate.
 - CW20-1D "ROAD WORK AHEAD" signs may be substituted for CW21-6D "SURVEY CREW AHEAD" signs.
 - The CW21-6D "SURVEY CREW AHEAD" sign for low volume intersecting side roads is desirable, but is not required when working less than 15 minutes in area of the side road, as determined by the Engineer.
- TCP (S-2a)
- Road closures shall be less than 20 minutes. Closures less than 5 minutes are desirable.
 - Sign spacing should be increased if traffic repeatedly queues past the CW20-7b "BE PREPARED TO STOP" sign.
 - The surveying instrument should not be located on the paved surface.
- TCP (S-2b)
- For short duration work the Shadow Vehicle with a TMA may be replaced by another Work Vehicle with high intensity rotating, flashing or strobe lights.
 - Shadow Vehicles with a TMA are desirable when workers or equipment are in the work space. When approved by the engineer, Type III barricades or other channelizing devices may be substituted for the Shadow Vehicle.
 - The CW20-7b "BE PREPARED TO STOP" sign is optional. When used, it should be installed after the CW20-4D "ONE LANE ROAD AHEAD" sign.

WHENEVER POSSIBLE, SURVEY PARTIES SHOULD AVOID, BY THE USE OF OFFSET LINES, ANY UNNECESSARY PERIODS OF TIME ON THE ROAD SURFACE.

8-18-08 Revision
 Corrected reference to notes.

Texas Department of Transportation
 Traffic Operations Division

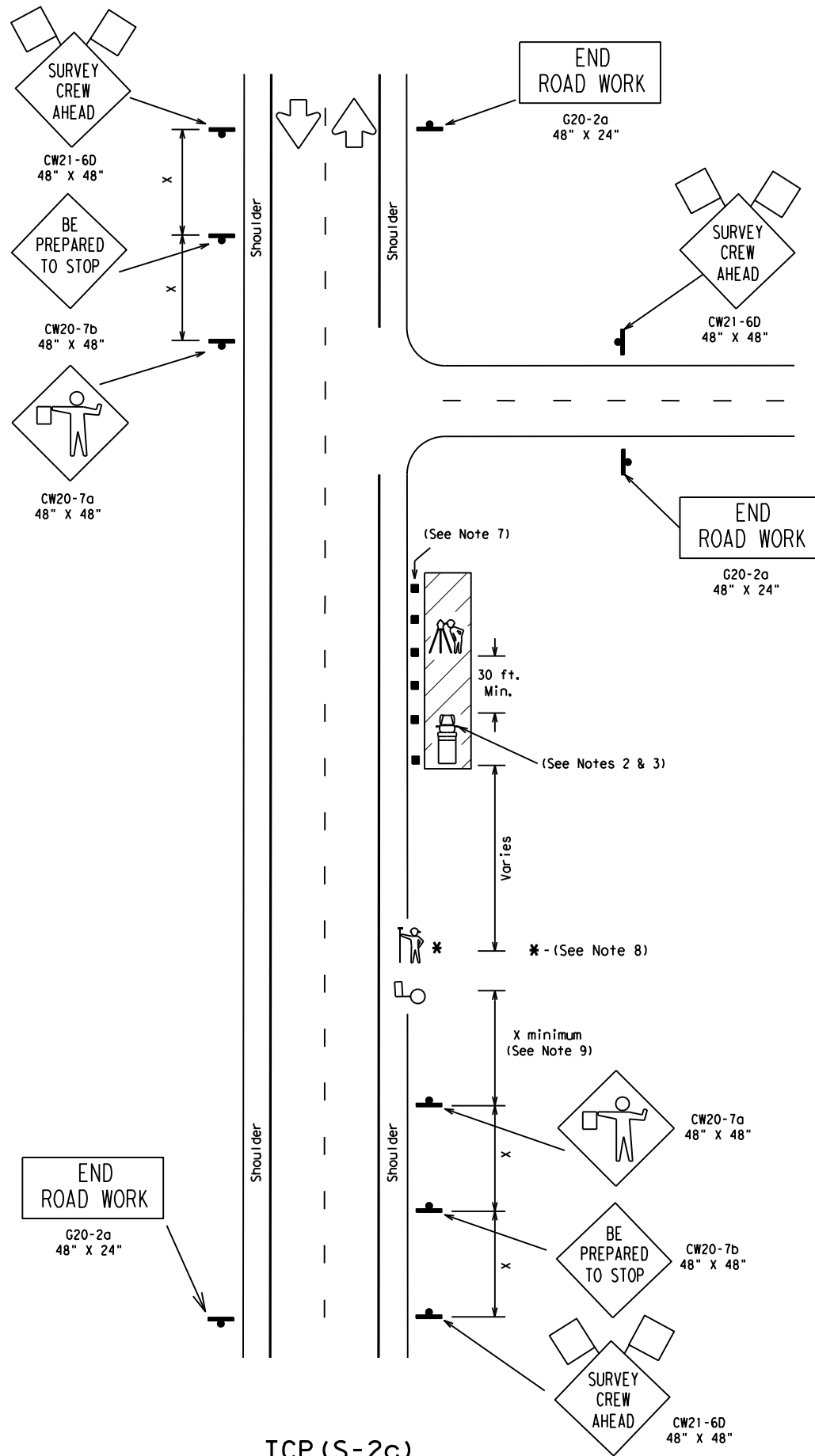
TRAFFIC CONTROL PLAN FOR SURVEYING OPERATIONS

TCP (S-2) - 08A

© TxDOT August 2008	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
8-08	REVISONS	CONT	SECT	JOB
		0205	02	067
		DIST	COUNTY	SHEET NO.
		BRY	ROBERTSON	31

DATE: 8/25/2021 9:21:04 AM
 FILE: \\txdot.projectwiseonline.com:TXDOT14\Documents\17 - BRY\Design Projects\020502067\4 - Design\Plan Set\2 - TCP\2B - TCP\Plan Set\2 - TCP\2B - TCP\2C.dgn

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



Posted Speed (mph)	Distance (ft)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820
80	910

LEGEND

- Type III Barricade
- Channelizing Devices
- Flag
- Work Vehicle
- Truck Mounted Attenuator (TMA)
- Flagger
- Sign Post
- Survey Rodman
- Instrument Person

Posted Speed %	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Device		Min. Sign Spacing "x" Distance	Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60' - 75'	120'	90'
35		205'	225'	245'	35'	70' - 90'	160'	120'
40		265'	295'	320'	40'	80' - 100'	240'	155'
45	L=WS	450'	495'	540'	45'	90' - 110'	320'	195'
50		500'	550'	600'	50'	100' - 125'	400'	240'
55		550'	605'	660'	55'	110' - 140'	500'	295'
60		600'	660'	720'	60'	120' - 150'	600'	350'
65		650'	715'	780'	65'	130' - 165'	700'	410'
70		700'	770'	840'	70'	140' - 175'	800'	475'
75		750'	825'	900'	75'	150' - 185'	900'	540'

* Conventional Roads Only
 ** Taper lengths have been rounded off.
 L=Length of Taper (FT.) W=Width of Offset (FT.) S=Posted Speed (MPH)

	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
MOBILE	✓	✓		

DEFINITIONS:
 MOBILE - work that moves continuously or intermittently (stopping up to approximately 15 minutes).
 SHORT DURATION - work that occupies a location up to 1 hour.
 SHORT TERM STATIONARY - daytime work that occupies a location for more than 1 hour within a single daylight period.

- GENERAL NOTES:
- The G20-2a "END ROAD WORK" sign may be placed on the back of the CW21-6D "SURVEY CREW AHEAD" sign or may be omitted for short duration (less than 1 hour) work.
 - Work Vehicle with high intensity rotating, flashing, oscillating or strobe lights should be used to protect work space.
 - When approved by the engineer, Type III barricades or other channelizing devices may be substituted for the Heavy Work Vehicle.
 - CW20-1D "ROAD WORK AHEAD" signs may be substituted for CW21-6D "SURVEY CREW AHEAD" SIGNS.
 - The CW21-6D "SURVEY CREW AHEAD" sign for low volume intersecting side roads may be omitted when approved by the Engineer.
 - The Surveying Instrument shall not be located on the paved surface.
 - Cones at edge of pavement adjacent to instrument person may be omitted when approved by the Engineer.
 - Rodman may only enter roadway when accompanied by flagger and as traffic allows.
 - The distance between the advance warning signs and the work should not exceed a two mile maximum.
 - Flaggers and Survey Crew should use two-way radios or other means of communication.
 - Survey Crew and Flaggers shall wear high-visibility apparel meeting the ANSI 107-2007 standard performance for Class 2 or Class 3 risk exposure.
 - Additional traffic control devices may be required to address local site conditions.
 - Stopping Sight Distance shall be maintained from approaching traffic to the flagger. See "Stopping Sight Distance" table.

SURVEY PARTIES SHOULD AVOID ANY UNNECESSARY PERIODS OF TIME ON THE ROAD SURFACE.

This TCP is to cover two lane rural type roadways as determined by the Engineer. All other type roadways will be covered by other established Survey TCP'S.



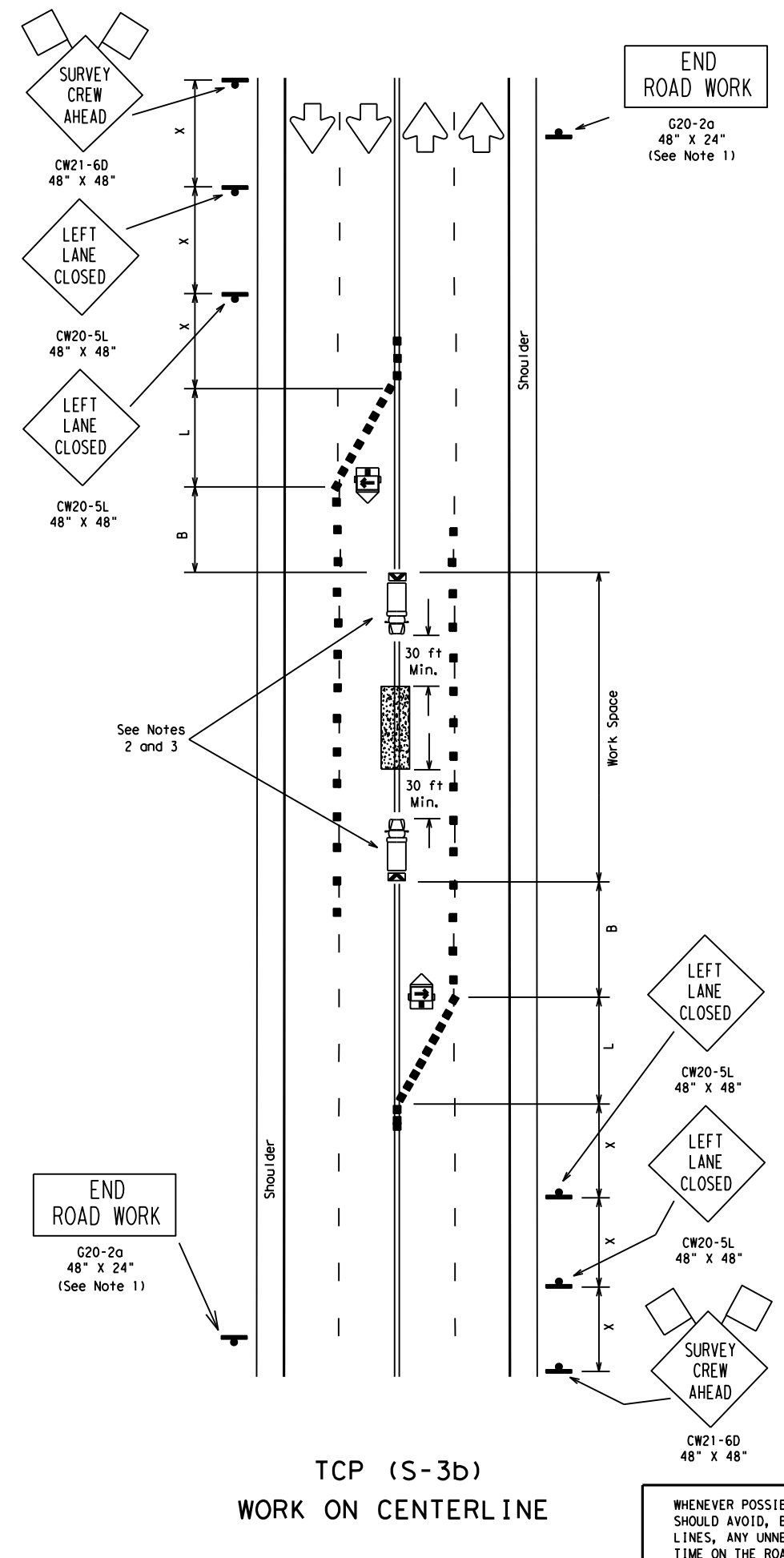
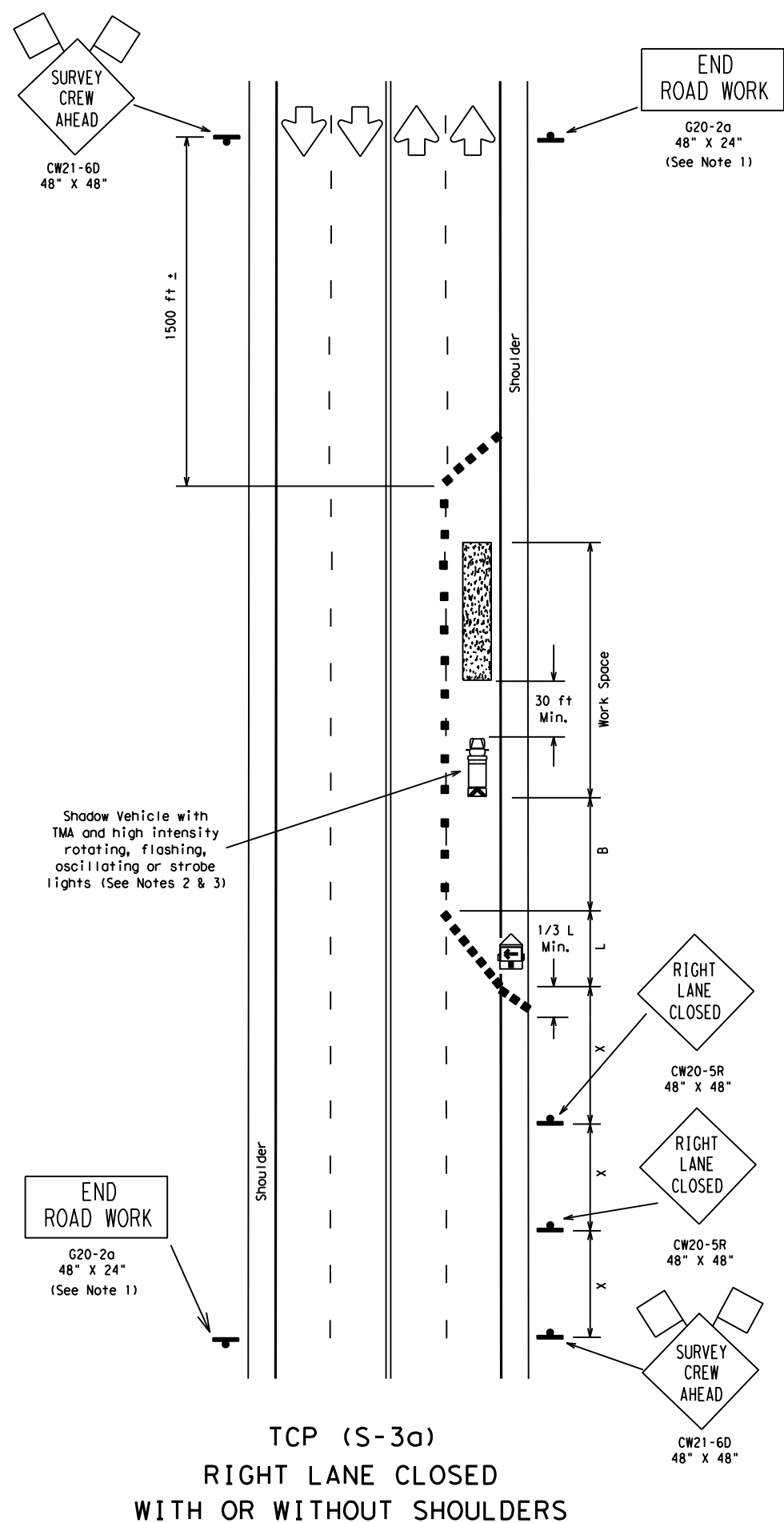
TRAFFIC CONTROL PLAN FOR SURVEYING OPERATIONS

TCP (S-2c) - 10

© TxDOT January 2010		DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
REVISIONS					
CONT	SECT	JOB		HIGHWAY	
0205	02	067		US 79	
DIST		COUNTY		SHEET NO.	
BRY		ROBERTSON		32	

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 8/25/2021 9:21:10 AM
 FILE: \\txdot.projectwiseonline.com:TXDOT14\Documents\17 - BRY\Design Projects\020502067\4 - Design\Plan Set\2 - TCP\2B - TCP Standard\TCPS3.dgn



WHENEVER POSSIBLE, SURVEY PARTIES SHOULD AVOID, BY THE USE OF OFFSET LINES, ANY UNNECESSARY PERIODS OF TIME ON THE ROAD SURFACE.

LEGEND

	Type III Barricade		Channelizing Devices		Flag
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)		
	Trailer Mounted Flashing Arrow Panel		Portable Changeable Message Sign (PCMS)		
	Flagger		Sign Post		

Posted Speed * S	Formula	Minimum Desirable Taper Lengths ** L			Suggested Maximum Spacing of Device On a Taper / On a Tangent		Min. Sign Spacing "X" Distance	Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60' - 75'	120'	90'
35		205'	225'	245'	35'	70' - 90'	160'	120'
40		265'	295'	320'	40'	80' - 100'	240'	155'
45		450'	495'	540'	45'	90' - 110'	320'	195'
50		500'	550'	600'	50'	100' - 125'	400'	240'
55		550'	605'	660'	55'	110' - 140'	500'	295'
60		600'	660'	720'	60'	120' - 150'	600'	350'
65	650'	715'	780'	65'	130' - 165'	700'	410'	
70	700'	770'	840'	70'	140' - 175'	800'	475'	
75	750'	825'	900'	75'	150' - 185'	900'	540'	

* Conventional Roads Only
 ** Taper lengths have been rounded off.
 L=Length of Taper (FT.) W=Width of Offset (FT.) S=Posted Speed (MPH)

TYPICAL USAGE:

MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

DEFINITIONS:
 SHORT DURATION - work that occupies a location up to 1 hour.
 SHORT TERM STATIONARY - daytime work that occupies a location for more than 1 hour within a single daylight period.

- GENERAL NOTES:**
- The G20-2a "END ROAD WORK" sign may be placed on the back of the CW21-6D "SURVEY CREW AHEAD" sign or may be omitted for short duration (less than 1 hour) work.
 - For short duration work the Shadow Vehicle with TMA may be replaced by another Work Vehicle with high intensity rotating, flashing or strobe lights.
 - Shadow Vehicles with a TMA are desirable when workers or equipment are in the work space. When approved by the engineer, Type III barricades or other channelizing devices may be substituted for the Shadow Vehicle.
 - CW20-1D "ROAD WORK AHEAD" signs may be substituted for CW21-6D "SURVEY CREW AHEAD" signs.
 - The CW21-6D "SURVEY CREW AHEAD" sign for low volume intersecting side roads is desirable, but is not required when working less than 15 minutes in area of the side road, as determined by the Engineer.

TCP (S-3a)
 6. If shoulders are not present, the 1/3L shoulder taper is to be omitted and four channelizing devices shall be placed in front of the arrow panel, perpendicular to traffic.

TCP (S-3b)
 7. One CW20-5L "LEFT LANE CLOSED" sign in each direction may be omitted when the posted speed is less than 45mph and volume is less than 2000 ADT.

Texas Department of Transportation
 Traffic Operations Division

TRAFFIC CONTROL PLAN FOR SURVEYING OPERATIONS

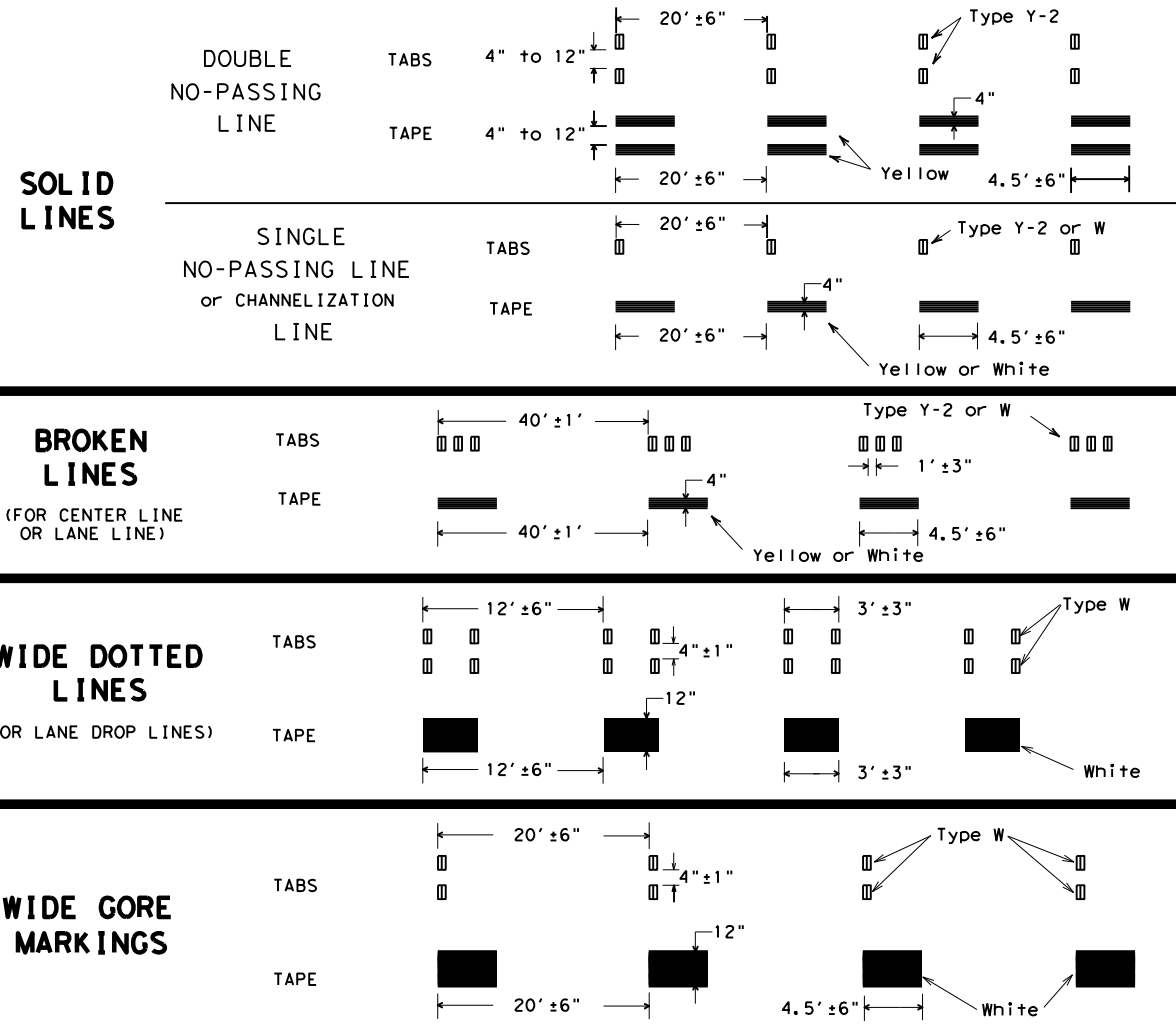
TCP (S-3) -08

© TxDOT August 2008		DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
REVISIONS		CONT	SECT	JOB	HIGHWAY
		0205	02	067	US 79
		DIST	COUNTY	SHEET NO.	
		BRY	ROBERTSON	33	

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of units or for the accuracy of the information contained herein. For more information, contact the TxDOT Design Office at (512) 861-6000.

DATE: 8/25/2021 9:21:28 AM
 FILE: \\txdot.projectwiseonline.com:TXDOT14\Documents\17 - BRY\Design Projects\170810001\170810001.dgn

WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



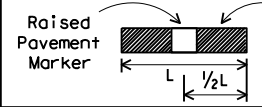
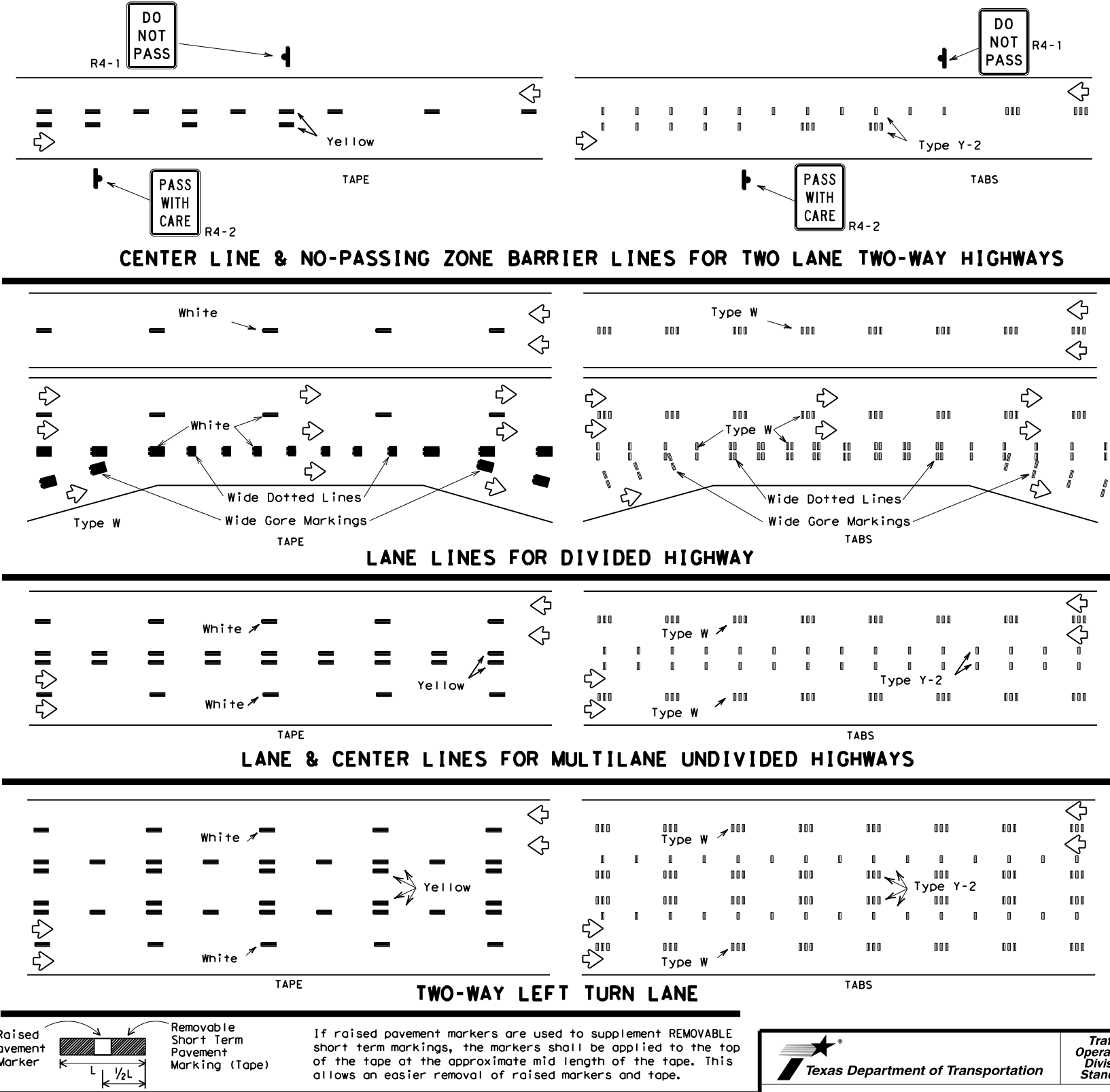
NOTES:

- Short term pavement markings may be prefabricated markings (stick down tape) or temporary flexible-reflective roadway marker tabs unless otherwise specified elsewhere in plans.
- Short term pavement markings shall NOT be used to simulate edge lines.
- Dimensions indicated on this sheet are typical and approximate. Variations in size and height may occur between markers or devices made by manufacturers, by as much as 1/4 inch, unless otherwise noted.
- Temporary flexible-reflective roadway marker tabs will require normal maintenance replacement when used on roadways with an ADT per lane of up to 7500 vehicles with no more than 10% truck mix. When roadways exceed these values, additional maintenance replacement of devices should be planned.
- No segment of roadway open to traffic shall remain without permanent pavement markings for a period greater than 14 calendar days. The Contractor will be responsible for maintaining short term pavement markings until permanent pavement markings are in place. When the Contractor is responsible for placement of permanent pavement markings, no segment of roadway shall remain without permanent pavement markings for a period greater than 14 calendar days unless weather conditions prohibit placement. Permanent pavement markings shall be placed as soon as weather permits.
- For two lane, two-way roadways, DO NOT PASS signs shall be erected to mark the beginning of sections where passing is prohibited and PASS WITH CARE signs shall be erected to mark the beginning of sections where passing is permitted. Signs shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and may be used to indicate the limits of no-passing zones for up to 14 calendar days. Permanent pavement markings should then be placed.
- For low volume two lane, two-way roadways of 4000 ADT or less, no-passing lines may be omitted when approved by the Engineer. DO NOT PASS and PASS WITH CARE signs shall be erected (see note 6).
- For exit gores where a lane is being dropped place wide gore markings or retroreflective channelizing devices to guide motorist through the exit. If channelizing devices are to be used it should be noted elsewhere in the plans. One piece cones are not allowed for this purpose.

TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

- Temporary flexible-reflective roadway marker tabs detailed on this sheet will be designated Type Y-2 (two amber reflective surfaces with yellow body); Type Y (one amber reflective surface with yellow body); and Type W (one white or silver reflective surface with white body). Additional details may be found on BC(11).
- Tabs shall meet requirements of Departmental Material Specification DMS-8242.
- When dry, tabs shall be visible for a minimum distance of 200 feet during normal daylight hours and when illuminated by automobile low-beam head light at night, unless sight distance is restricted by roadway geometrics.
- No two consecutive tabs nor four tabs per 1000 feet of line shall be missing or fail to meet the visual performance requirements of Note 3.

WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



If raised pavement markers are used to supplement REMOVABLE short term markings, the markers shall be applied to the top of the tape at the approximate mid length of the tape. This allows an easier removal of raised markers and tape.

PREFABRICATED PAVEMENT MARKINGS

- Temporary Removable Prefabricated Pavement Markings shall meet the requirements of DMS-8241.
- Non-removable Prefabricated Pavement Markings shall meet the requirements of either DMS-8240 "Permanent Prefabricated Pavement Markings" or DMS-8243 "Temporary Construction-Grade Prefabricated Pavement Markings."

RAISED PAVEMENT MARKERS

- All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and DMS-4200.

DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS) & MATERIAL PRODUCER LISTS (MPL)

- DMSs referenced above can be found along with embedded links to their respective MPLs at the following website:
http://www.txdot.gov/business/contractors_consultants/material_specifications/default.htm

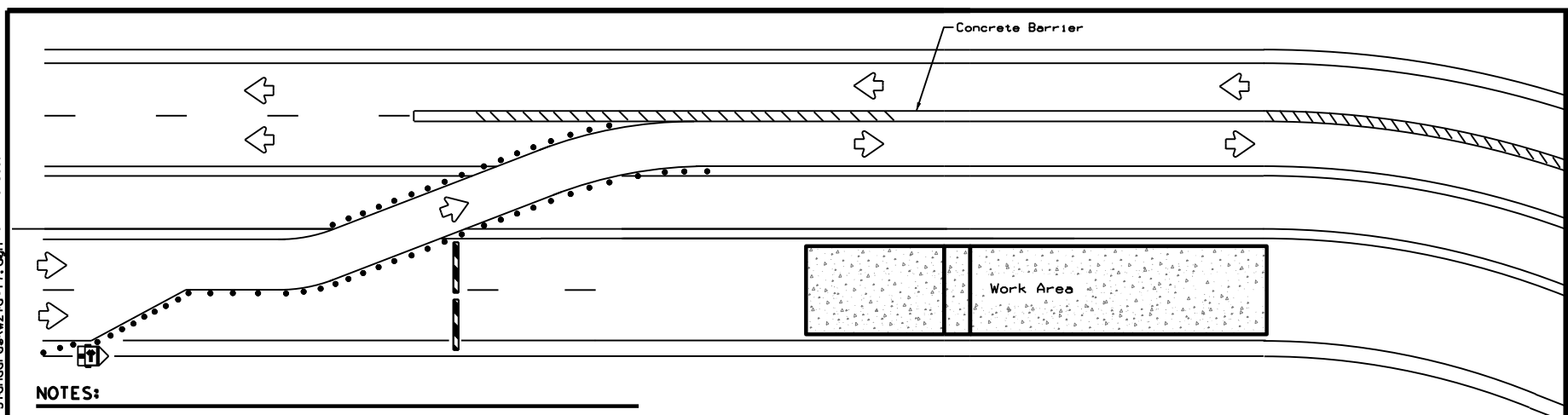


WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ (STPM) - 13

FILE:	wzstpm-13.dgn	DN:	TxDOT	CK:	TxDOT	OW:	TxDOT	CK:	TxDOT
© TxDOT	April 1992	CONT:	0205	SECT:	02	JOB:	067	US	79
REVISIONS		DIST:	BRY	COUNTY:	ROBERTSON	SHEET NO.:			36

DATE: 8/25/2021 9:21:34 AM
 FILE: \\txdot\project\seon\line.com\TXDOT\Documents\17 - BRY\Design\Projects\08050908 TGA\08050908.dwg
 DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this drawing to any other format.



NOTES:

1. Length of Safety Glare screen will be specified elsewhere in the plans.
2. The cumulative nominal length of the modular safety glare screen units shall equal the length of the individual sections of temporary concrete traffic barrier on which they are installed so the joint between barrier sections will not be spanned by any one safety glare screen unit.
3. Screen Panel/blades will be designed such that reflective sheeting conforming with Departmental Material Specification DMS-8300, Sign Face Materials, Type B or C Yellow, minimum size of 2 inches by 12 inches can be attached to the edge of the panel/blade. The sheeting shall be attached to one glare screen panel/blade per section of concrete barrier not to exceed a spacing of 30 feet. Barrier reflectors are not necessary when panel/blades are installed with reflective sheeting as described.
4. Payment for these devices will be under statewide Special Specification "Modular Glare Screens for Headlight Barrier."
5. This detail is only intended to show types of locations where Glare Screens would be appropriate. Required signing and other devices shall be as shown elsewhere in the plans.

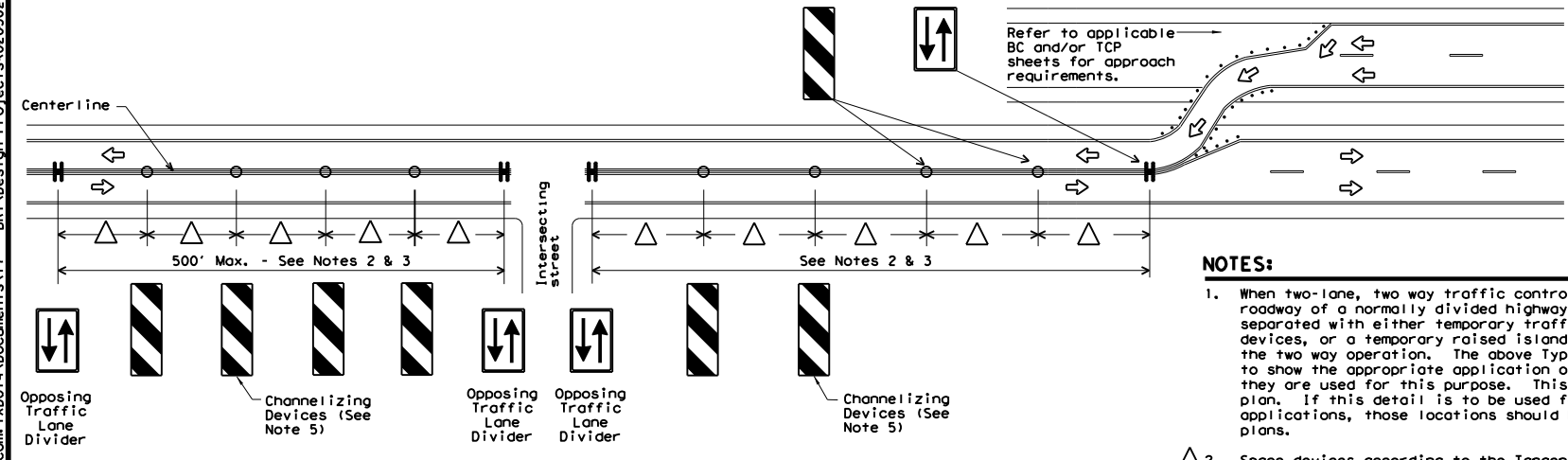
BARRIER DELINEATION WITH MODULAR GLARE SCREENS

LEGEND	
	Type 3 Barricade
	Channelizing Devices
	Trailer Mounted Flashing Arrow Board
	Sign
	Safety glare screen

DEPARTMENTAL MATERIAL SPECIFICATIONS	
SIGN FACE MATERIALS	DMS-8300
DELINEATORS AND OBJECT MARKERS	DMS-8600
MODULAR GLARE SCREENS FOR HEADLIGHT BARRIER	DMS-8610

Only pre-qualified products shall be used. A copy of the Compliant Work Zone Traffic Control Devices List" CWZTCD) describes pre-qualified products and their sources and may be found at the following web address:

<http://www.txdot.gov/business/resources/producer-list.html>



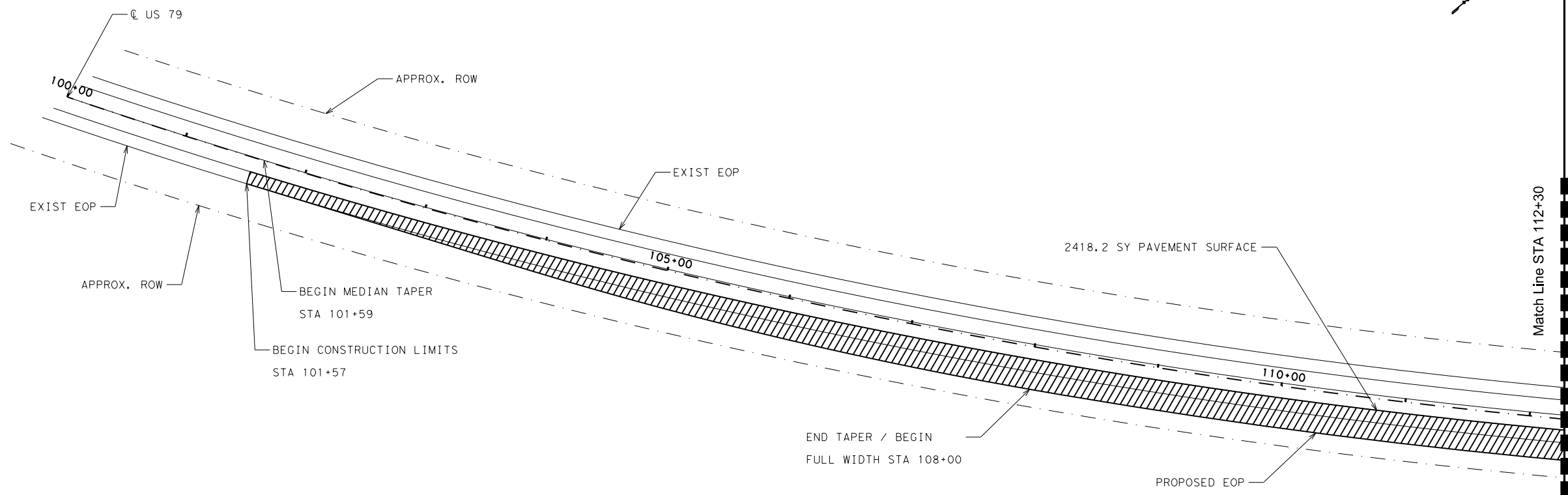
NOTES:

1. When two-lane, two way traffic control must be maintained on one roadway of a normally divided highway, opposing traffic shall be separated with either temporary traffic barriers, channelizing devices, or a temporary raised island throughout the length of the two way operation. The above Typical Application is intended to show the appropriate application of channelizing devices when they are used for this purpose. This is not a traffic control plan. If this detail is to be used for other types of roads or applications, those locations should be stated elsewhere in the plans.
2. Space devices according to the Tangent Spacing shown on the Device Spacing table on BC(9) but not exceeding 100'.
3. Every fifth device should be an OTLD except when spaced closer to accommodate an intersection. An OTLD should be the first device on each side of intersecting streets or roads.
4. Locations where surface mount bases with adhesives or self-righting devices will be required in order to maintain them in their proper position should be noted elsewhere in the plans.
5. Channelizing devices are to be vertical panels, 42" cones or tubular markers that are at least 36" tall. Tubular markers used to separate traffic should have a rubber base weighing at least 30 pounds. Tubular markers that are 42" tall or more shall have four bands of reflective material as detailed for 42" cones on BC(10). Tubular markers less than 42" but at least 36" tall shall have three bands of 3" wide white reflective material spaced 2" apart. Reflective material shall meet DMS-8300, Type A.

VERTICAL PANELS & OPPOSING TRAFFIC LANE DIVIDERS (OTLD) SEPARATING TWO-WAY TRAFFIC ON NORMALLY DIVIDED HIGHWAYS

		Traffic Operations Division Standard	
TRAFFIC CONTROL PLAN TYPICAL DETAILS			
WZ(TD) - 17			
FILE: wzttd-17.dgn	DN: TxDOT	CK: TxDOT	DR: TxDOT
© TxDOT February 1998	CONT	SECT	HIGHWAY
4-98	REVISIONS	0205 02	067 US 79
3-03	2-17	DIST	COUNTY
7-13		BRY	ROBERTSON
			SHEET NO. 37

REV DATE: 2-12-2015
 CS: XXXX-XX-XXX
 FILENAME: p:\x\dot\project\issueline.com\T\DOT\4\Documents\17 - BRY\Design\Projects\0205020674 - Design\Plan Set\3 - Roadway\Plan Set\3 - Roadway\3D - Roadway\Plan And Profile\Streets\Roadway\Layout



LEGEND

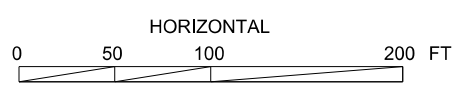
Subgrade Widening

GENERAL NOTES:

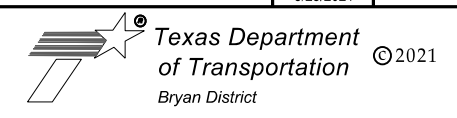
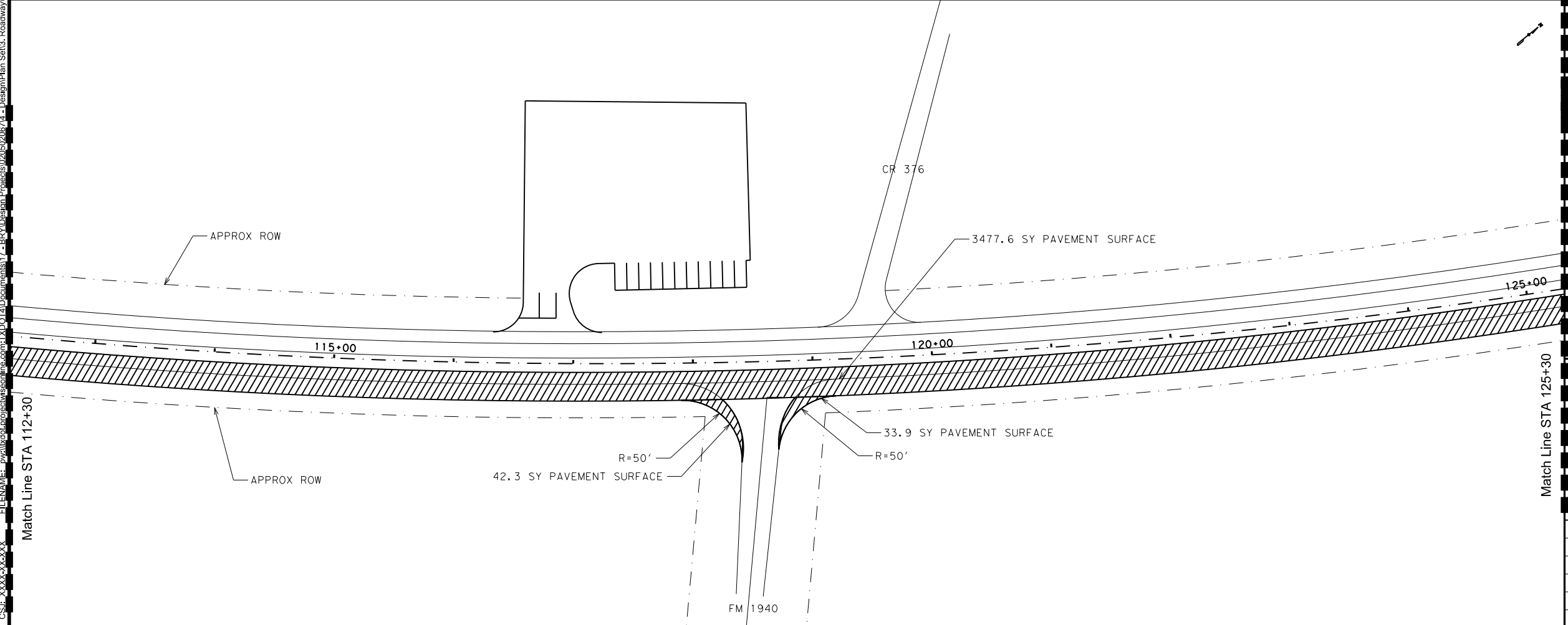


Timothy Tyler Thomason

8/25/2021



PRINT DATE	REVISION DATE
8/25/2021	



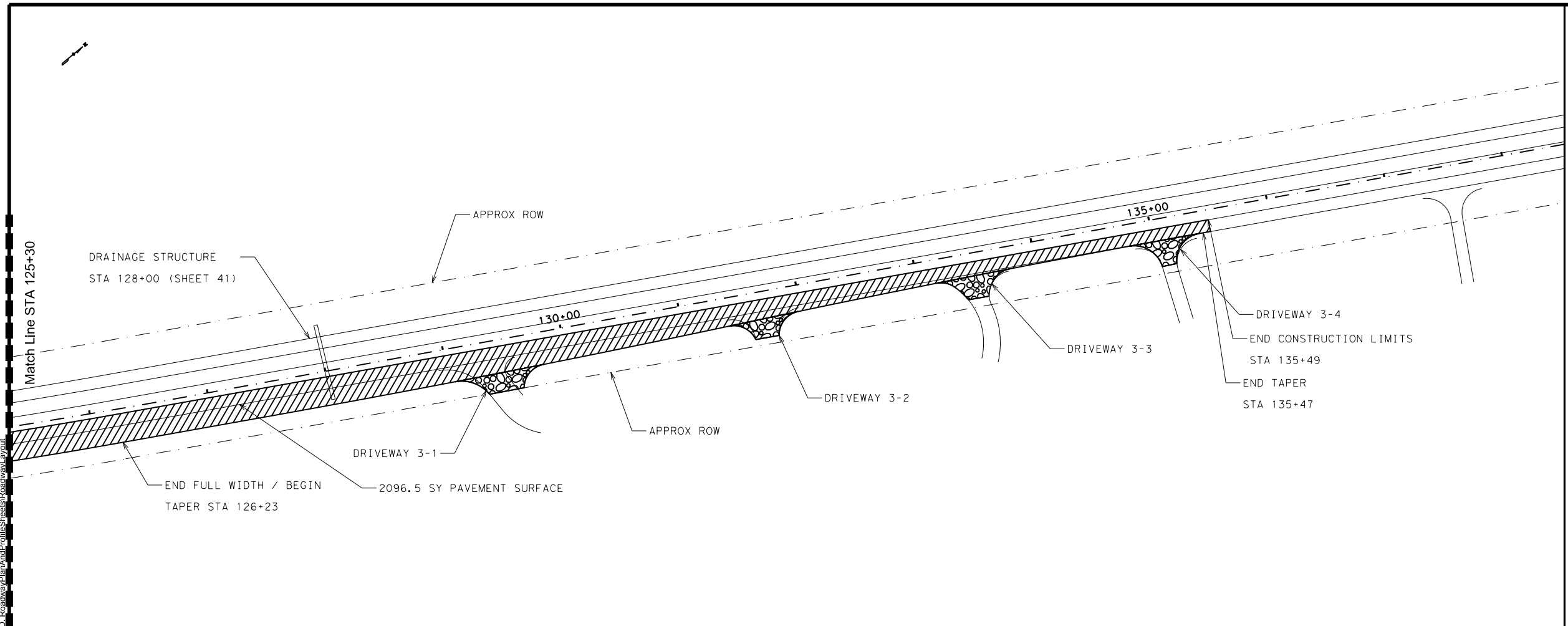
ROADWAY LAYOUT
 SHEET 1 OF 2

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER	
6	F 2022(117)	US 79	
STATE	DISTRICT	COUNTY	
TEXAS	BRYAN	ROBERTSON	
CONTROL	SECTION	JOB	SHEET NO.
0205	02	067	39


Match Line STA 112+30

Match Line STA 125+30

REV DATE: 2-12-2015
 CSJ: XXXX-XX-XXX
 FILENAME: p:\t\dot\project\wseonline.com\T\DOT\4\Documents\17 - BRY\Design Projects\02050206714 - Design\Plan Set\3 - Roadway\Plan Set\3 - Roadway\3D_Roadway\Plan And Profiles\Roadway\Layout



LEGEND

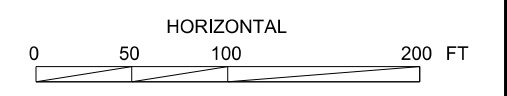
 Subgrade Widening

GENERAL NOTES:

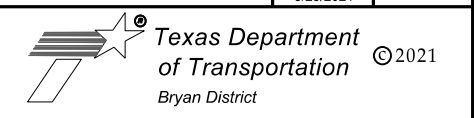


Timothy Tyler Thomason

8/25/2021



PRINT DATE	REVISION DATE
8/25/2021	



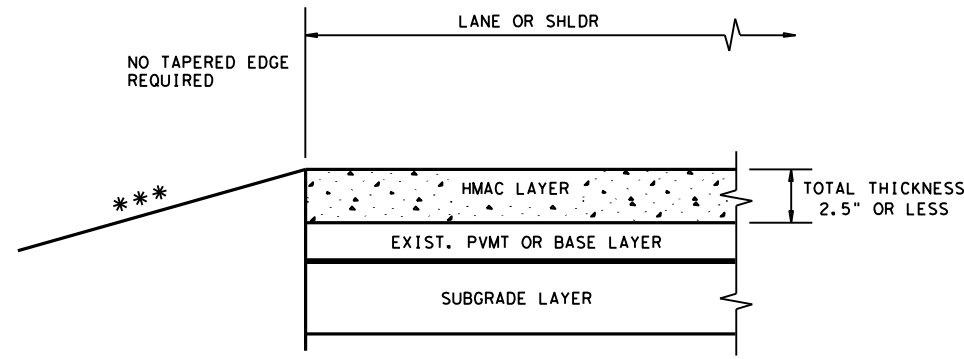
ROADWAY LAYOUT

SHEET 2 OF 2

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER	
6	F 2022(117)	US 79	
STATE	DISTRICT	COUNTY	
TEXAS	BRYAN	ROBERTSON	
CONTROL	SECTION	JOB	SHEET NO.
0205	02	067	40

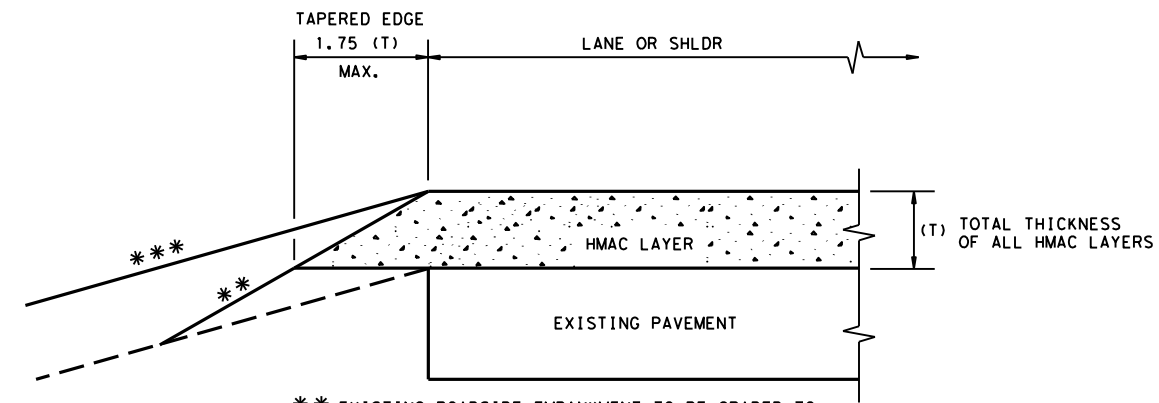
DISCLAIMER:
 The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 8/25/2021
 FILE: \\txdot\project\wiseonline.com\TXDOT14\Documents\17 - BRY\Design Projects\020502067\4 - Design\Plan Set\3. Roadway\Plan Set\3. RoadwayStandards\tehmac11.dgn



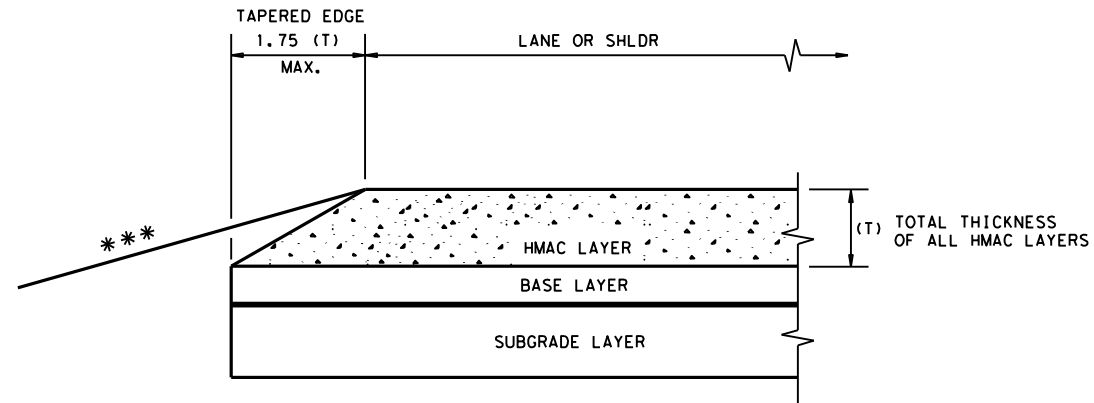
*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 1
 THIN HMAC SURFACES OR HMAC OVERLAY
 WITH THICKNESS OF 2.5" OR LESS



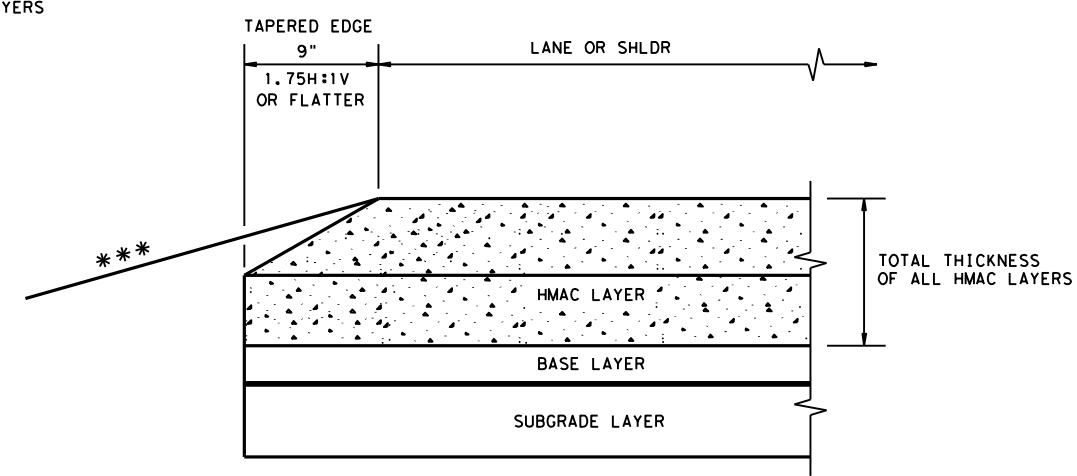
** EXISTING ROADSIDE EMBANKMENT TO BE GRADED TO PRODUCE A SMOOTH LEVEL SURFACE FOR PLACEMENT OF TAPERED EDGE. THIS WORK IS SUBSIDIARY TO THE VARIOUS BID ITEMS.
 *** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 2
 OVERLAY OF EXISTING PAVEMENT
 HMAC THICKNESS 2.5" TO 5"



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 3
 NEW OR RECONSTRUCTED PAVEMENT
 HMAC THICKNESS 2.5" TO 5"



*** SEE TYPICAL SECTION FOR ROADSIDE DETAILS

CONDITION - 4
 NEW OR RECONSTRUCTED PAVEMENT
 HMAC THICKNESS 5" OR GREATER

GENERAL NOTES

1. UNLESS OTHERWISE SHOWN IN THE PLANS, A VERTICAL EDGE IS PERMISSIBLE FOR HMAC PLACED GREATER THAN 5" BELOW THE EDGE OF PAVEMENT AND FOR THICKNESS OF HMAC LESS THAN 2.5".
2. FOR FURTHER INFORMATION REGARDING THE ROADSIDE AND PAVEMENT DETAILS, SEE TYPICAL SECTIONS.
3. PAYMENT FOR TAPERED EDGE WILL BE IN ACCORDANCE WITH APPLICABLE ITEMS IN THE CONTRACT.
4. THE SLOPE OF THE TAPERED EDGE SHALL BE 1.75H:1V OR FLATTER.
5. THE TAPERED EDGE SHALL BE PRODUCED BY USE OF A SCREED ATTACHMENT CAPABLE OF PRODUCING A SMOOTH COMPACTED SURFACE. ADDITIONAL COMPACTING EFFORT BEHIND THE SCREED IS NOT REQUIRED.

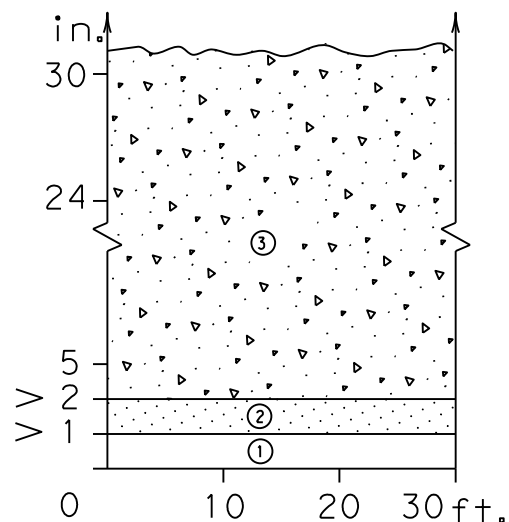
(NOT TO SCALE)

				Design Division Standard	
TAPERED EDGE DETAILS HMAC PAVEMENT					
TE (HMAC) - 11					
FILE: tehmac11.dgn	DN: TxDOT	CK: RL	DW: KB	CK:	
© TxDOT January 2011	CONT	SECT	JOB	HIGHWAY	
REVISIONS		0205 02	067	US 79	
DIST	COUNTY		SHEET NO.		
BRY	ROBERTSON		41		

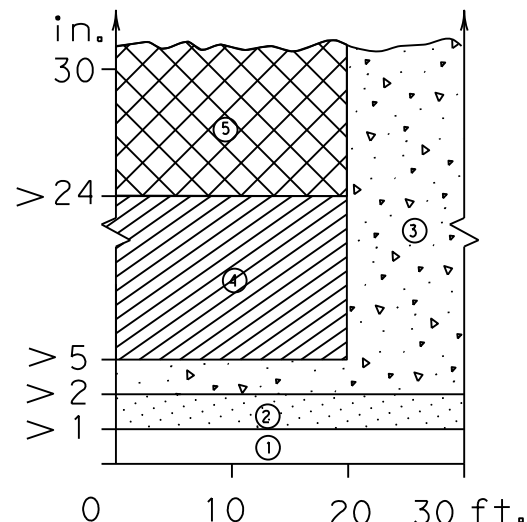
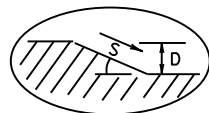
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DEFINITION OF TREATMENT ZONES FOR VARIOUS EDGE CONDITIONS

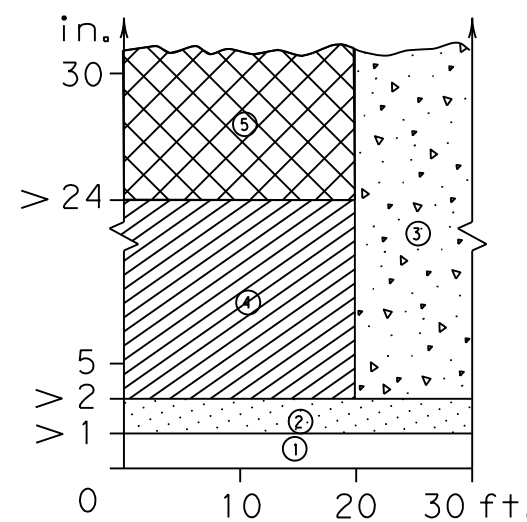
Edge Height (D) in Inches versus Lateral Clearance (Y) in Feet



Edge Condition I
S = (3:1) (or flatter)



Edge Condition II
S = ((2.99):1) to (1:1)



Edge Condition III
S is steeper than (1:1)

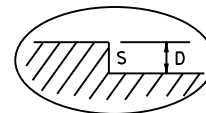
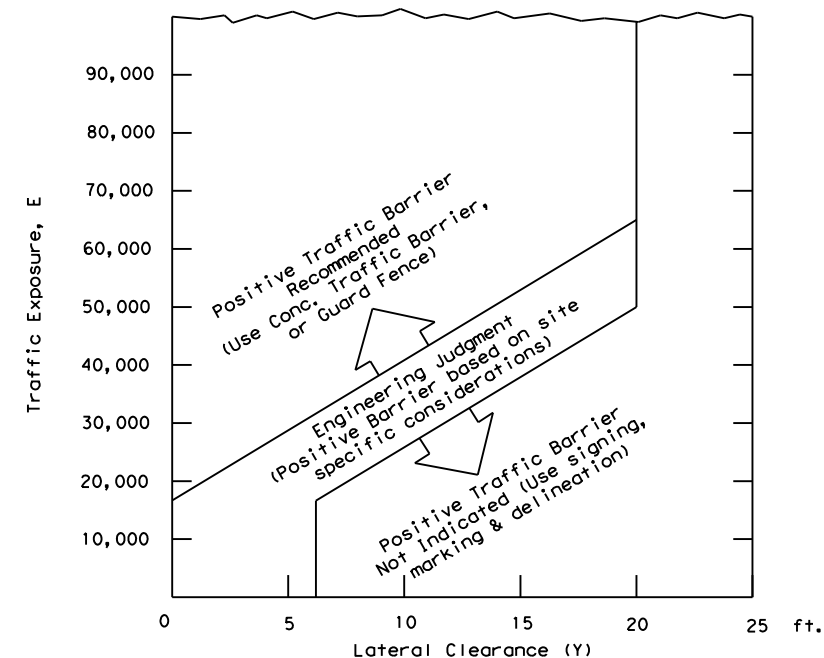


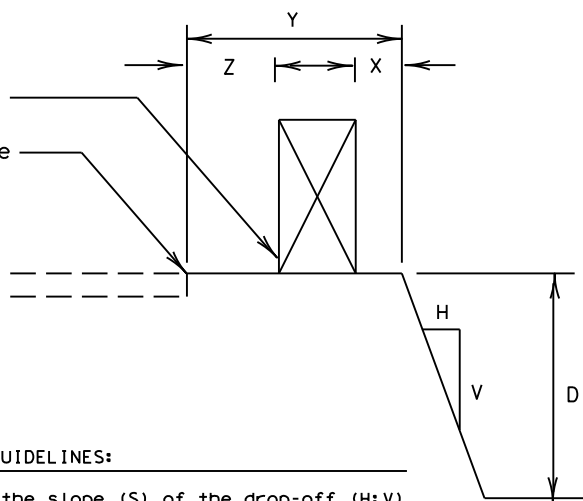
FIGURE-1: CONDITIONS INDICATING USE OF POSITIVE BARRIER FOR ZONE 5 ([Cross-hatched symbol])



- E = ADT x T
Where ADT is that portion of the average daily traffic volume traveling within 20 feet (generally two adjacent lanes) of the edge dropoff condition; and, T is the duration time in years of the dropoff condition.
- Figure-1 provides a practical approach to the use of positive barriers for the protection of vehicles from pavement drop-offs. Other factors, such as the presence of heavy machinery, construction workers, or the mix and volume of traffic may make the use of positive barriers appropriate, even when the edge condition alone may not justify the use of a barrier.
- An approved end treatment should be provided for any positive barrier end located within a lateral offset of 20 feet from the edge of the travel lane.

These guidelines apply to temporary traffic control areas or work zones where continuous pavement edges or drop-offs exist parallel and adjacent to a lane used by traffic. The edge conditions may be present between shoulders and travel lanes, between adjacent or opposing travel lanes, or at intermediate points across the width of the paved surface. Due to the variability in construction operations, tolerances in the variables may be allowed by the engineer. These guidelines do not apply to short term operations. These guidelines do not constitute a rigid standard or policy; rather, they are guidance to be used in conjunction with engineering judgement. These guidelines may be updated on the Design Division's on-line manuals.

Warning Device or Traffic Barrier
4" White Edge Line or Edge of Lanes being used for maintenance of traffic.



FACTORS CONSIDERED IN THE GUIDELINES:

- The "Edge Condition" is the slope (S) of the drop-off (H:V). The "Edge Height" is the depth of the drop-off "D".
- Distance "X" is to be the maximum practical under job conditions. Two feet minimum for high speed conditions. Distance "Y" is the lateral clearance from edge of travel lane to edge of dropoff. Distance "Z" does not have a minimum.
- In addition to the factors considered in the guidelines, each construction zone drop-off situation should be analyzed individually, taking into account other variables, such as: traffic mix, posted speed in the construction zone, horizontal curvature, and the practicality of the treatment options.
- The conditions for indicating the use of positive or protective barriers are given by Zone-5 and Figure-1. Traffic barriers are primarily applicable for high speed conditions. Urban areas with speeds of 30 mph or less may have a lesser need for signing, delineation, and barriers. Right-angled edges, however, with "D" greater than 2 inches and located within a lateral offset of 6 feet, may indicate a higher level of treatment.
- If the distance "Y" must be less than 3 feet, the use of a positive barrier may not be feasible. In such a case, consider either: 1) narrowing the lanes to a desired 11 to 12 feet or 10 foot minimum (see CW20-8 sign), or 2) provide an edge slope such as Edge Condition I.

Zone	Treatment Types Guidelines:
①	No treatment.
②	CW 8-11 "Uneven Lanes" signs.
③	CW 8-9a "Shoulder Drop-Off" or CW 8-11 signs plus vertical panels.
④	CW 8-9a or CW 8-11, signs plus drums. Where restricted space precludes the use of drums, use vertical panels. An edge fill may be provided to change the edge slope to that of the preferable Edge Condition I.
⑤	Check indications (Figure-1) for positive barrier. Where positive barrier is not indicated, the treatment shown above for Zone- 4 may be used after consideration of other applicable factors.

Edge Condition Notes:

- Edge Condition I: Most vehicles are able to traverse an edge condition with a slope rate of (3 to 1) or flatter. The slope must be constructed with a compacted material capable of supporting vehicles.
- Edge Condition II: Most vehicles are able to traverse an edge condition with a slope between (2.99 to 1) and (1 to 1) so long as "D" does not exceed 5 inches. Under-carriage drag on most automobiles will occur when "D" exceeds 6 inches. As "D" exceeds 24 inches, the possibility for rollover is greater in most vehicles.
- Edge Condition III: When slopes are greater than (1 to 1) and where "D" is greater than 2 inches, a more difficult control factor may exist for some vehicles, if not properly treated. For example, where "D" is greater than 2 inches and up to 24 inches different types of vehicles may experience different steering control at different edge heights. Automobiles might experience more steering control differential when "D" is greater than 2 inches and up to 5 inches. Trucks, particularly those with high loads, have more steering control differential when "D" is greater than 5 inches and up to 24 inches. When "D" exceeds 24 inches, the possibility of rollover is greater for most vehicles.
- Milling or overlay operations that result in Edge Condition III should not be in place without appropriate warning treatments, and these conditions should not be left in place for extended periods of time.

Engineer's Seal

 Date 8/25/2021

Texas Department of Transportation
Traffic Operations Division

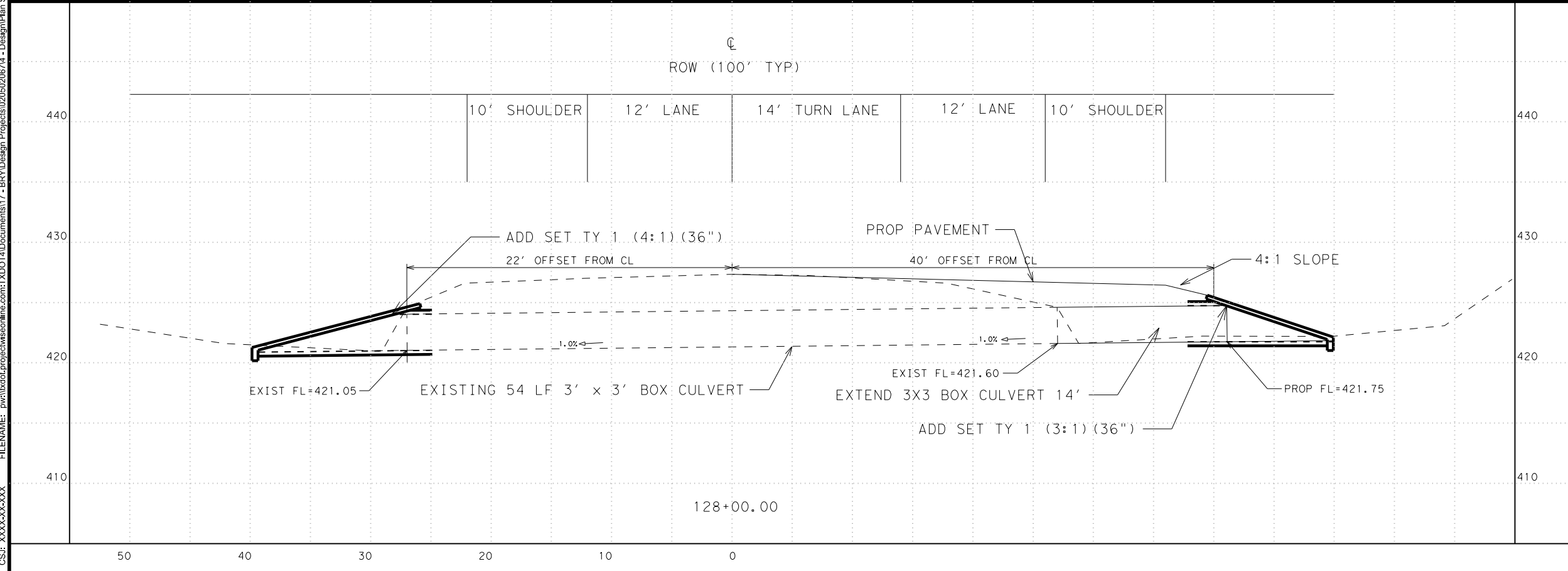
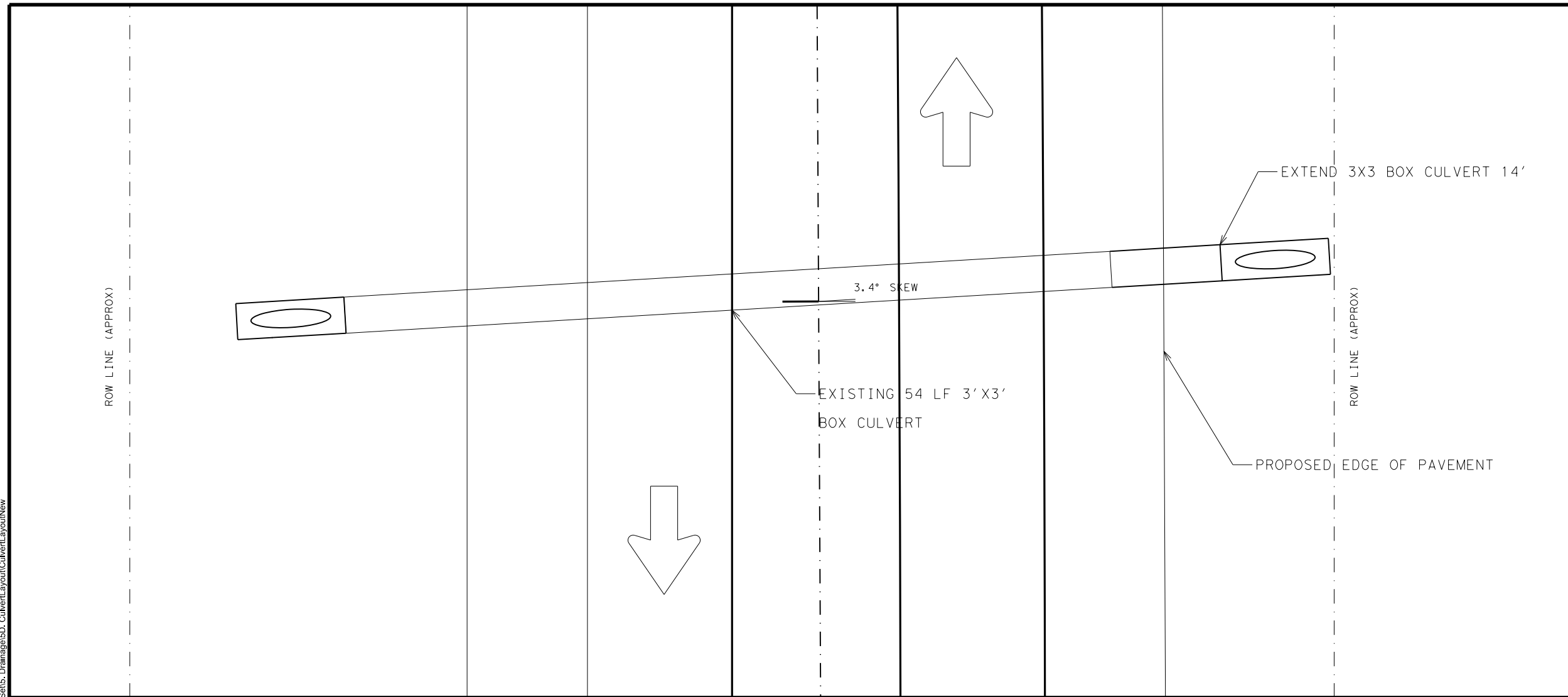
TREATMENT FOR VARIOUS EDGE CONDITIONS

© TxDOT August 2000		DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
REVISIONS					
CONT	SECT	JOB	HIGHWAY		
03-01	0205/02	067	US 79		
DIST		COUNTY	SHEET NO		
08-01 correct typos		BRY	ROBERTSON		42

DATE:
FILE:

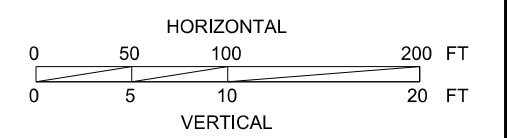
REV DATE: 2-12-2015
 CS: XXXX-XX-XX
 FILENAME: p:\x\dot\project\wiseonline.com\T\DOT\4\Documents\17 - BRY\Design Projects\0205020674 - Design\Plan Set\5 - Drainage\SD - CulvertLayout\CulvertLayoutNew

GENERAL NOTES:

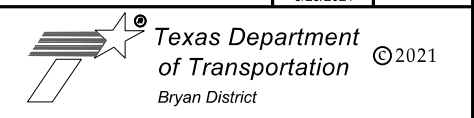


Timothy Tyler Thomason

8/25/2021



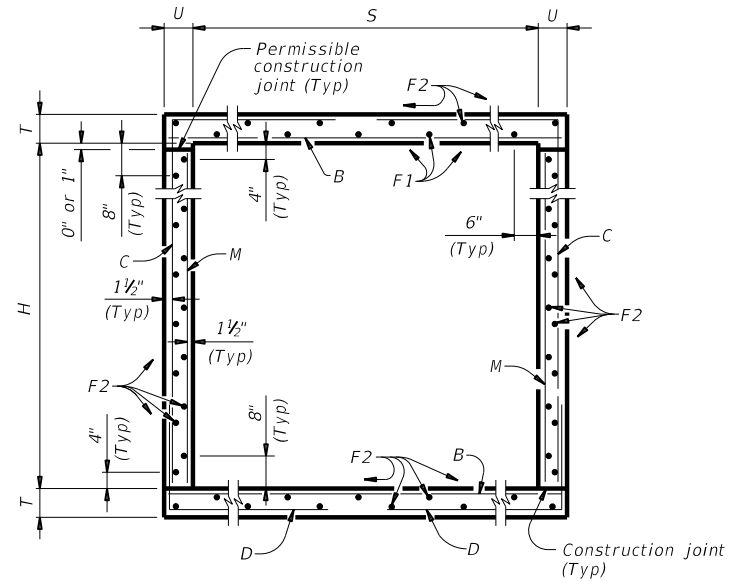
PRINT DATE	REVISION DATE
8/25/2021	



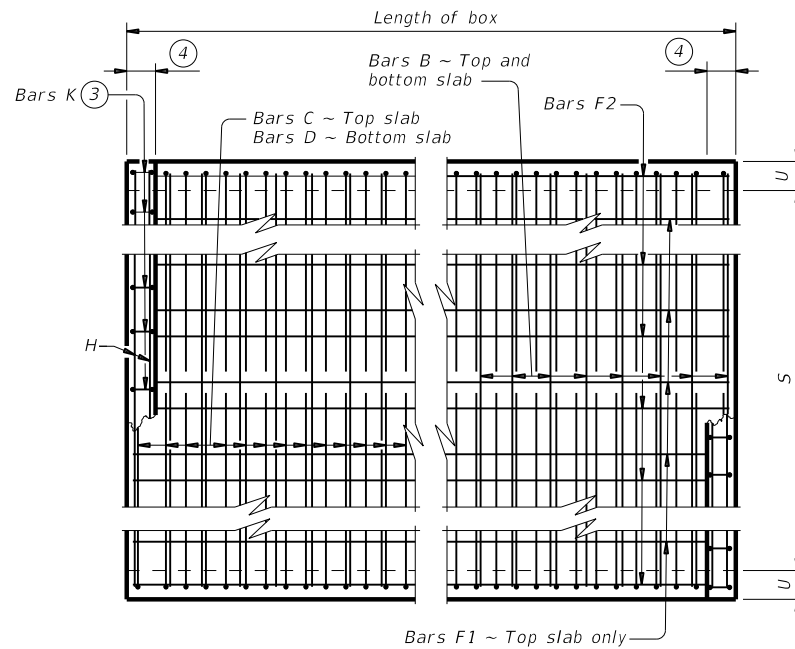
DRAINAGE PLAN & PROFILE

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER	
6	F 2022(117)	US 79	
STATE	DISTRICT	COUNTY	
TEXAS	BRYAN	ROBERTSON	
CONTROL	SECTION	JOB	SHEET NO.
0205	02	067	43

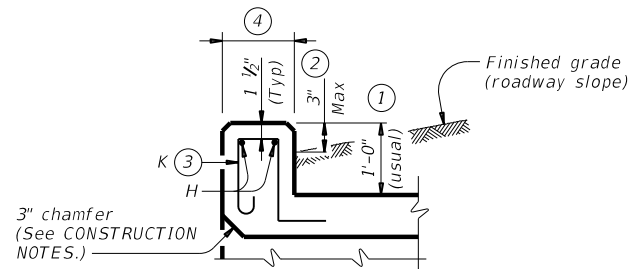
DATE: 8/25/2021 9:23:16 AM
 FILE: \\txdot.projectwiseonline.com:TXDOT14\Documents\17 - BRY\Design Projects\020502067\4 Curbs for box culverts\std\sc34ste-21.dgn
 DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of units.



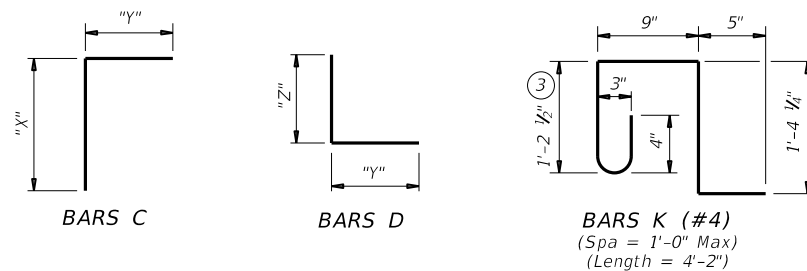
TYPICAL SECTION



PLAN OF REINF STEEL



SECTION THRU CURB



- ① 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0", refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Rail Anchorage Curb (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.
- ② For vehicle safety, the following requirements must be met:
 - For structures without bridge rail, construct curbs no more than 3" above finished grade.
 - For structures with bridge rail, construct curbs flush with finished grade. Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
- ③ For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.
- ④ 1'-0" typical. 2'-3" when the Rail Anchorage Curb (RAC) standard sheet is referred to elsewhere in the plans.

The Contractor may replace Bars B, C, D, E, F1, F2, M, Y, and/or Z with deformed welded wire reinforcement (WWR) meeting the requirements of ASTM A1064. The area of required reinforcement may be reduced by the ratio of 60 ksi / 70 ksi. Spacing of WWR is limited to 4" Min and 18" Max. When required, provide lap splices in the WWR of the same length required for the equivalent bar size, rounded up for wire sizes between conventional bar sizes. The lap length required for WWR is never less than the lap length required for uncoated #4 bars.

Example conversion: Replacing No. 6 Gr 60 at 6" Spacing with WWR.
 Required WWR = (0.44 sq. in. per 0.5 ft.) x (60 ksi / 70 ksi) = 0.755 sq. in. per ft.
 If D30.6 wire is used to meet the 0.755 sq. in. per ft. requirement in this example, the required spacing = (0.306 sq. in.) / (0.755 sq. in. per ft.) x (12 in. per ft.) = 4.86" Max spacing. Required lap length for the provided D30.6 wire is 2'-1" (the same minimum lap length required for uncoated #5 bars, as listed under MATERIAL NOTES).

CONSTRUCTION NOTES:

- Do not use permanent forms.
- Chamfer the bottom edge of the top slab 3" at the entrance.
- Optionally, raise construction joints shown at the flow line by a maximum of 6". If this option is taken, Bars M may be cut off or raised, Bars C and D may be reversed.

MATERIAL NOTES:

- Provide Grade 60 reinforcing steel.
- Provide galvanized reinforcing steel if required elsewhere in the plans.
- Provide Class C concrete (f'c = 3,600 psi) for culvert barrel and curb, with the following exceptions: provide Class S concrete (f'c = 4,000 psi) for top slabs of:
 - culverts with overlay,
 - culverts with 1-to-2 course surface treatment, or
 - culverts with the top slab as the final riding surface.
- Provide bar laps, where required, as follows:
 - Uncoated or galvanized ~ #4 = 1'-8" Min
 - Uncoated or galvanized ~ #5 = 2'-1" Min

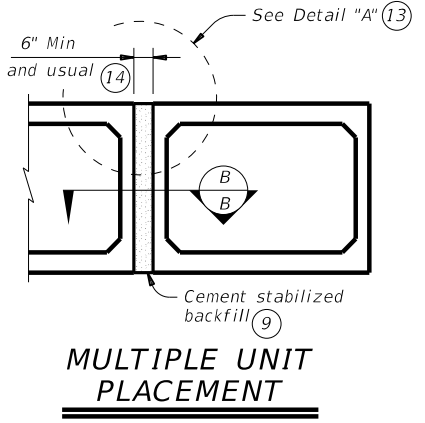
GENERAL NOTES:

- Designed according to AASHTO LRFD Bridge Design Specifications for the range of fill heights shown.
- See the Single Box Culverts Cast-In-Place Miscellaneous Detail (SCC-MD) standard sheet for details pertaining to skewed ends, angle sections, and lengthening.

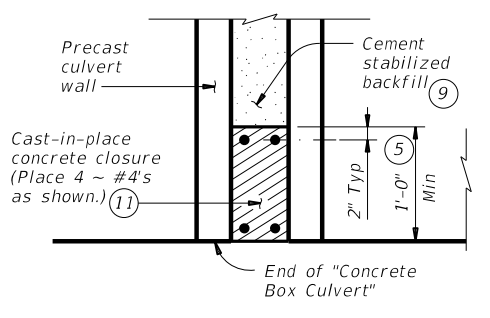
Cover dimensions are clear dimensions, unless noted otherwise.
 Reinforcing bar dimensions shown are out-to-out of bar.

HL93 LOADING		SHEET 1 OF 2	
			Bridge Division Standard
<h2 style="margin: 0;">SINGLE BOX CULVERTS CAST-IN-PLACE</h2> <p style="margin: 0;">0' TO 30' FILL</p>			
<h3 style="margin: 0;">SCC-3 & 4</h3>			
FILE: scc34ste-21.dgn	DN: TBE	CK: BMP	DW: TXDOT
TXDOT February 2020	CONT	SECT	JOB
REVISIONS	0205 02	067	US 79
04/2021 Updated X values.	DIST	COUNTY	SHEET NO.
BRY	ROBERTSON		45

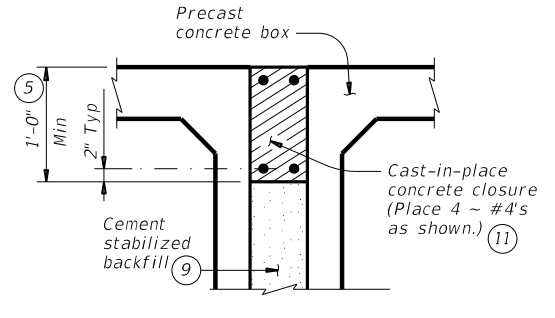
DATE: 8/25/2021 9:23:23 AM
 FILE: \\txdot\project\wiseonline.com\TXDOT14\Documents\17 - BRY\Design\Project\0205020674\0205020674.dgn
 PROJECT: 0205020674
 DRAWING: 0205020674-SCPMDS-20.dgn
 DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of units.



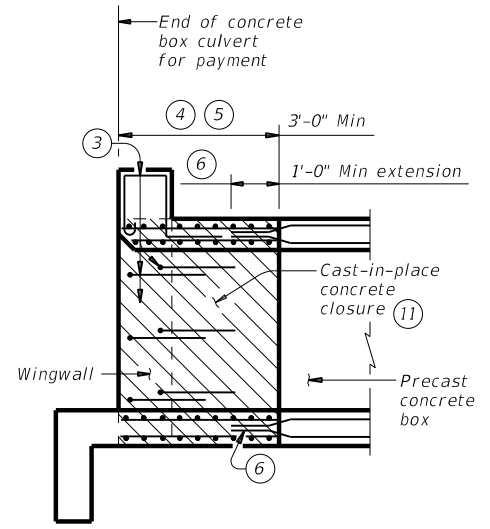
MULTIPLE UNIT PLACEMENT



SECTION B-B

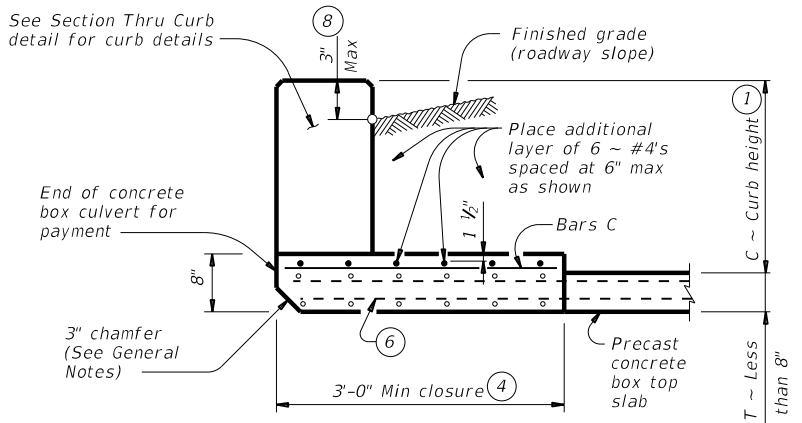


DETAIL "A"

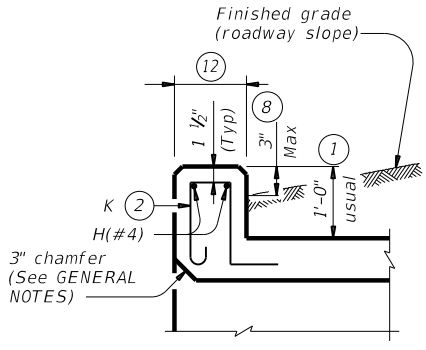


WINGWALL CONNECTION

(Also applies to safety end treatment.)

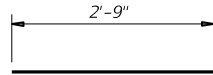


SECTION THRU TOP SLABS LESS THAN 8"

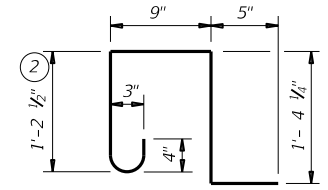


SECTION THRU CURB

QUANTITIES PER FOOT OF CURB	
Reinforcing Steel	4.12 Lb
Concrete	0.037 CY



BARS C (#4)
(Spa = 1'-0" Max)



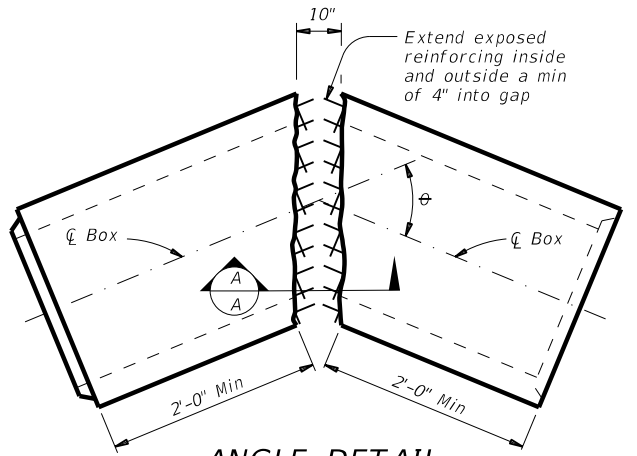
BARS K (#4)
(Spa = 1'-0" Max)
(Length = 4'-2")

- 1 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail, bicycle rail, or curbs taller than 1'-0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.
- 2 For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.
- 3 Extend curb, wingwall, or safety end treatment reinforcing into concrete closure. Bend or trim, as necessary, any reinforcing that does not fit into closure area.
- 4 Provide a 3'-0" Min cast-in-place concrete closure. Break back boxes in the field or cast boxes short. Provide bands of reinforcing in the closure that are the same size and spacing as in the precast box section. Provide #4 longitudinal reinforcement spaced at 12 inches Max within the closure. Except where shown otherwise, construct the cast-in-place closure flush with the inside and outside faces of the precast box section.
- 5 For multiple unit placements, adjust the length of the closure for the interior walls as necessary. Provide a 3'-0" Min cast-in-place closure in the top slab, bottom slab, and exterior wall. See Section B-B detail when interior walls are cast full length.
- 6 Extend precast box reinforcing a minimum of 1'-0" into concrete closure (Typ).
- 7 Place bands of reinforcing matching the inside and outside face reinforcing in the gaps of the top and bottom slabs. Place a band matching the outside face reinforcing of the wall in the gaps of the walls (placed in the outside face only). Tack weld the bands to the exposed reinforcing at each point of contact.
- 8 For vehicle safety, the following requirements must be met:
 - For structures without bridge rail, construct curbs no more than 3" above finished grade.
 - For structures with bridge rail, construct curbs flush with finished grade. Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
- 9 Cement stabilized backfill between boxes is considered part of the box culvert for payment.
- 10 All curb concrete and reinforcing is considered part of the box culvert for payment.
- 11 Any additional concrete and reinforcing required for the closures will be considered subsidiary to the box culvert for payment.
- 12 1'-0" typical. 2'-3" when the Box Culvert Rail Mounting Details (RAC) standard sheet is referred to elsewhere in the plans.
- 13 For multiple unit placement with overlay, with 1 to 2 course surface treatment, or with the top slab as the final riding surface, provide wall closure as shown in Detail "A".
- 14 This dimension may be increased with approval of the Engineer to allow the precast boxes to be tunneled or jacked in accordance with Item 476, "Jacking, Boring, or Tunneling Pipe or Box". No payment will be made for any additional material in the gap between adjacent boxes.

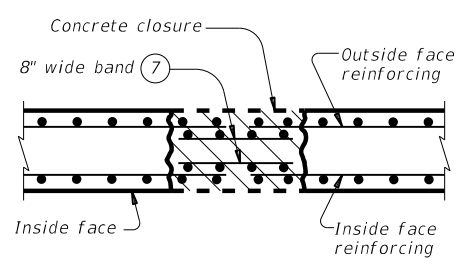
MATERIAL NOTES:
 Provide Grade 60 reinforcing steel.
 Provide ASTM A1064 welded wire reinforcement.
 Provide Class C concrete (f_c = 3,600 psi) for the closures.
 Provide cement stabilized backfill meeting the requirements of Item 400, "Excavation and Backfill for Structures."
 Any additional concrete required for the closures will be considered subsidiary to the box culvert.

GENERAL NOTES:
 Designed according to AASHTO LRFD Bridge Design Specifications.
 Refer to the Single Box Culverts Precast (SCP) standard sheets for details and notes not shown.
 Chamfer the bottom edge of the top slab closure 3 inches at culvert closure ends.

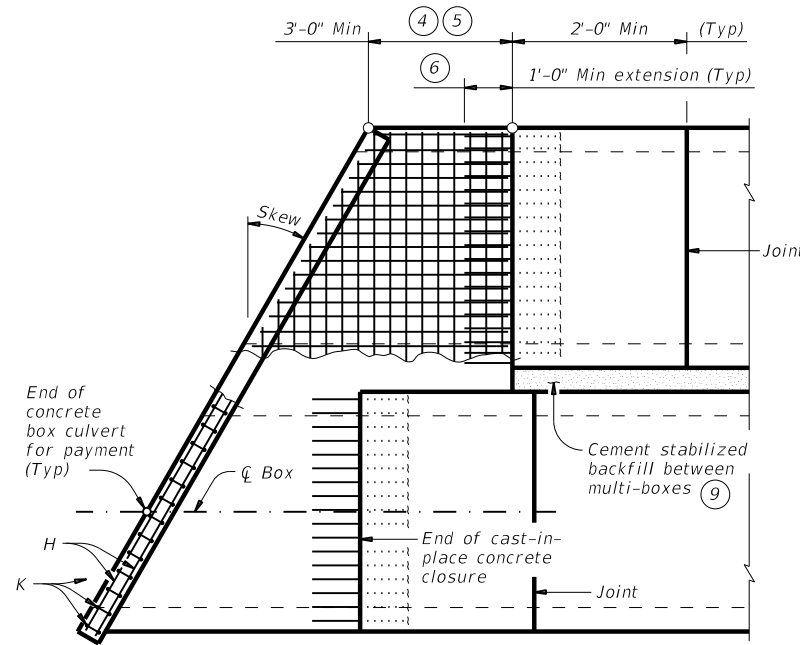
Cover dimensions are clear dimensions, unless noted otherwise.
 Reinforcing bars dimensions are out-to-out of bars.



ANGLE DETAIL



SECTION A-A



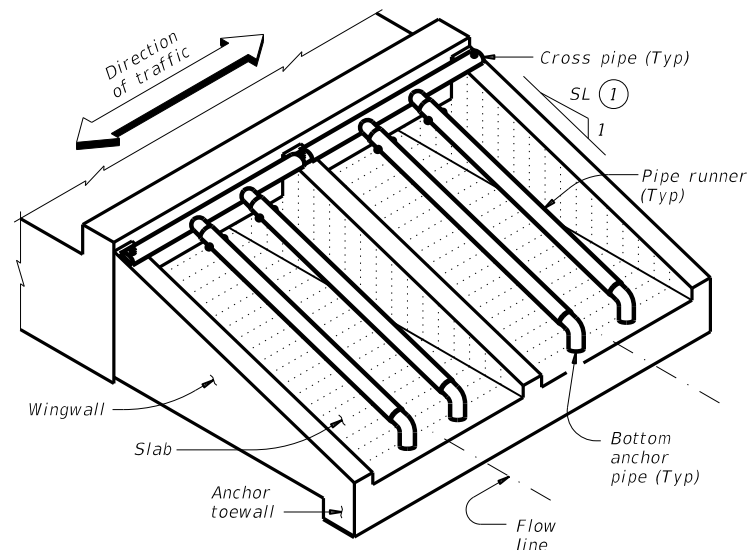
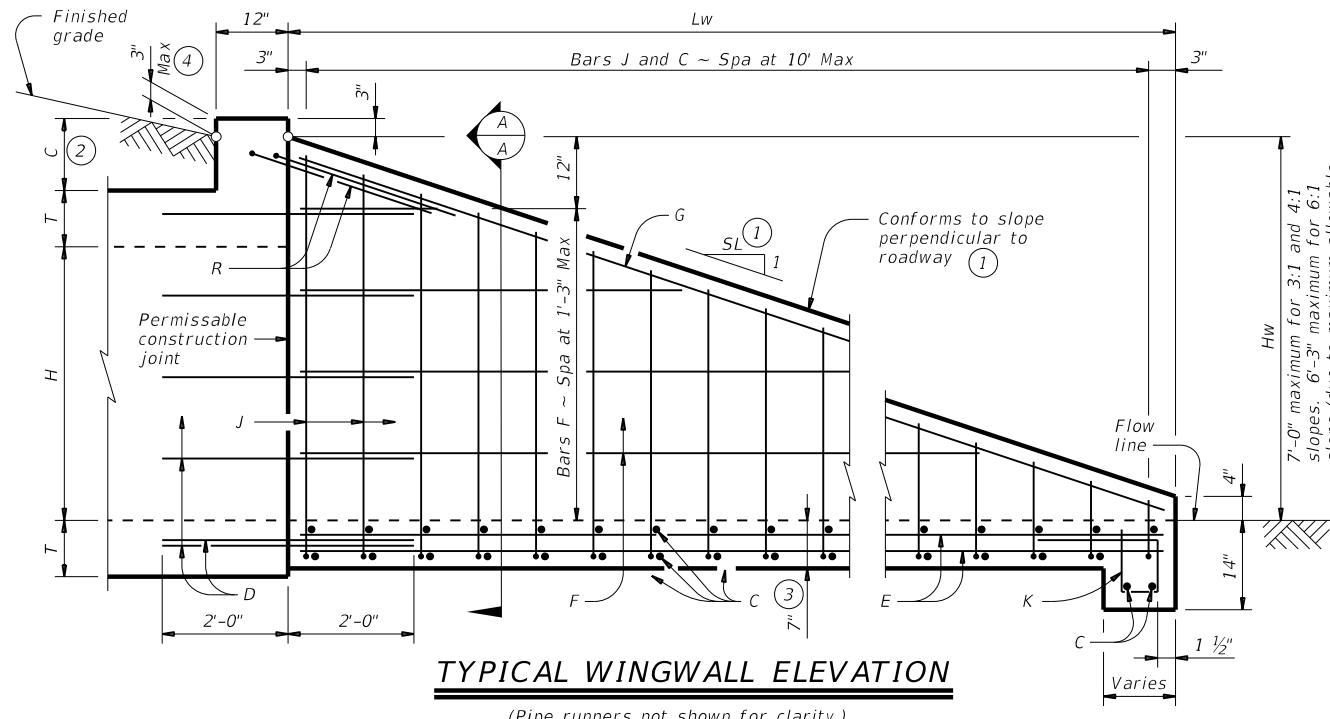
PLAN OF SKEWED ENDS

(Showing multi-box placement.)

HL93 LOADING

		Bridge Division Standard	
BOX CULVERTS PRECAST MISCELLANEOUS DETAILS			
SCP-MD			
FILE: scpmdsts-20.dgn	DN: GAF	CK: LMW	DW: BWH/TxDOT
©TxDOT February 2020	CONT	SECT	JOB
REVISIONS	0205 02	067	US 79
DIST:	COUNTY:	SHEET NO.	
BRY	ROBERTSON	47	

DATE: 8/25/2021 9:23:34 AM
 FILE: \\txdot.projectwiseonline.com:TXDOT14\Documents\17 - BRY\Design\Projects\0205020674\0205020674.dgn
 PROJECT: 0205020674
 DRAWING: 0205020674-SETB-CD-20.dgn
 DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this drawing to any other format.



WING DIMENSION CALCULATIONS:

$$H_w = H + T + C - 0.250'$$

$$L_w = (H_w - 0.333') (SL)$$

For cast-in-place culverts:

$$A_{tw} = (N)(S) + (N + 1)(U)$$

For precast culverts:

$$A_{tw} = (N)(2U + S) + (N - 1)(0.500')$$

Total Wingwall Area (SF)

$$= (0.5)(H_w + 0.333')(L_w)(N + 1)$$

Total Concrete Volume (CY)

$$= [(Wingwall Area)(0.583') + (L_w)(A_{tw})(0.583') + (A_{tw})(1.167')(1.167' - 0.583')] \div (27)$$

PIPE RUNNER DIMENSION CALCULATIONS:

Pipe Runner Length

$$= (L_w)(K1) - (1.917')$$

Total Reinforcing (Lb)

$$= (1.55)(L_w)(A_{tw}) + (4.43)(A_{tw}) + (K2)(H_w)(N + 1)(\sqrt{L_w})$$

C = Height of curb above top of top slab (feet)
 Hw = Height of wingwall (feet)
 K = Constant value for use in formulas

Slope SL:1	K1	K2
3:1	~ 1.054	~ 7.45
4:1	~ 1.031	~ 8.49
6:1	~ 1.014	~ 10.30

Atw = Anchor toewall length (feet)
 Lw = Length of wingwall (feet)
 N = Number of culvert barrels
 SL:1 = Side slope ratio (horizontal : 1 vertical)

See applicable box culvert standard for H, S, T, and U values.

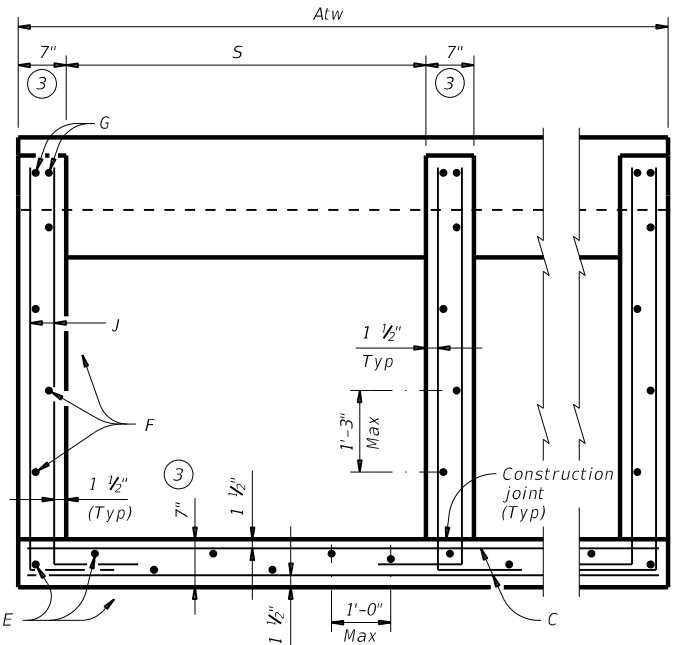
MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
 Provide galvanized reinforcing steel if required elsewhere in the plans.
 Adjust reinforcing as necessary to provide a minimum clear cover of 1 1/2".
 Provide Class "C" concrete (f'c = 3,600 psi).
 Provide pipe runners, cross pipes, and anchor pipes meeting the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.
 Provide ASTM A307 bolts.
 Galvanize all steel components, except the concrete reinforcing, unless required elsewhere in the plans, after fabrication.
 Repair galvanizing damaged during transport or construction in accordance with the Item 445, "Galvanizing".

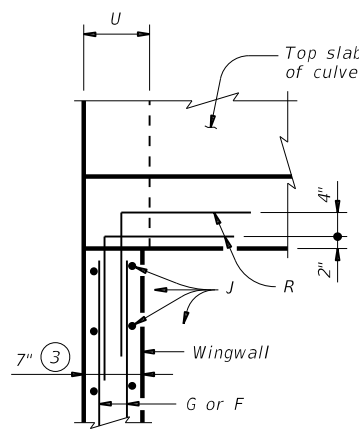
GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
 The safety end treatments shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the pipe runners.
 Pipe runners are designed for a traversing load of 1,800 pounds at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.
 The quantities for pipe runners, reinforcing steel, and concrete resulting from the formulas given herein are for Contractor's information only.
 See the Box Culvert Supplement (BCS) standard sheet for additional dimensions and information.
 Alternate design drawings bearing the seal of a professional engineer will be acceptable for precast construction of the safety end treatments.

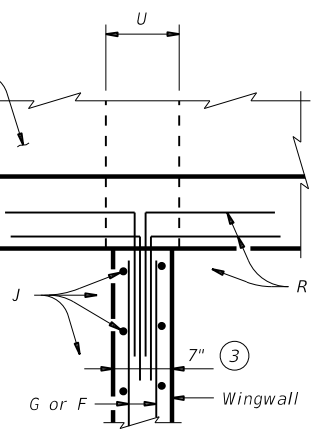
Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing dimensions are out-to-out of bars.



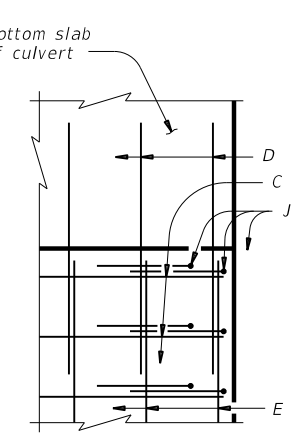
SECTION A-A
 (Showing typical wingwall and wing slab reinforcing. Pipe runners not shown for clarity.)



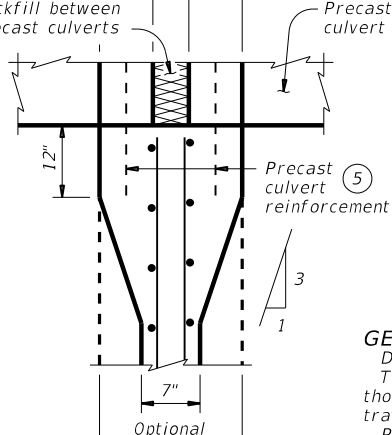
AT TOP OF EXTERIOR WINGWALL
 (Cast-in-place culvert)



AT TOP OF INTERIOR WINGWALL
 (Cast-in-place culvert)



AT OUTSIDE OF BOTTOM SLAB
 (Cast-in-place culvert)



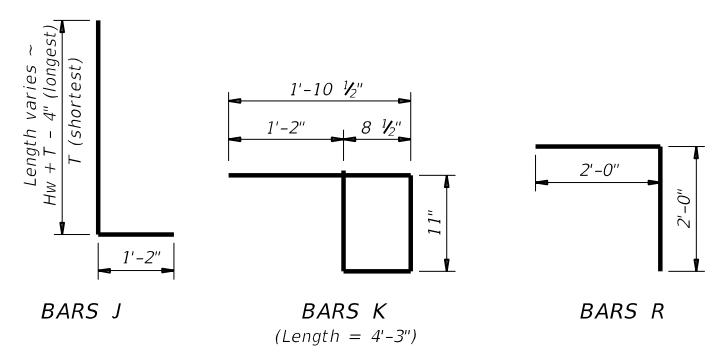
AT INTERIOR WINGWALL
 (Precast culvert)

PLAN VIEWS OF CORNER DETAILS

- Recommended values of slope are: 3:1, 4:1, and 6:1. Provide 3:1 or flatter slope.
- 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures without railing and curbs taller than 1'-0", refer to the Extended Curb Details (ECD) standard sheet.
- Wingwall and slab thicknesses may be the same as the adjacent culvert wall and slab thicknesses (7" minimum). If thicknesses greater than the minimum (7") are used, no changes will be made in quantities and no additional compensation will be allowed.
- For vehicle safety, reduce curb height, if necessary, to provide a maximum 3" projection. No changes will be made in quantities and no additional compensation will be allowed for this work.
- For culverts with C = 0", the precast culvert reinforcing may extend 1'-0" minimum into wingwall. Wingwall Bars D and R may be omitted. Otherwise, refer to the Wingwall Connection detail on the Box Culvert Precast Miscellaneous Details (SCP-MD) standard sheet.

TABLE OF REINFORCING BAR SIZES AND SPACING

Bar	Size	Spacing
C	#4	10" Max
D	#4	Match F and E
E	#4	1'-0" Max
F	#4	1'-3" Max
G	#6	As shown
J	#4	10" Max
K	#4	1'-0" Max
R	#4	As shown



SHEET 1 OF 2

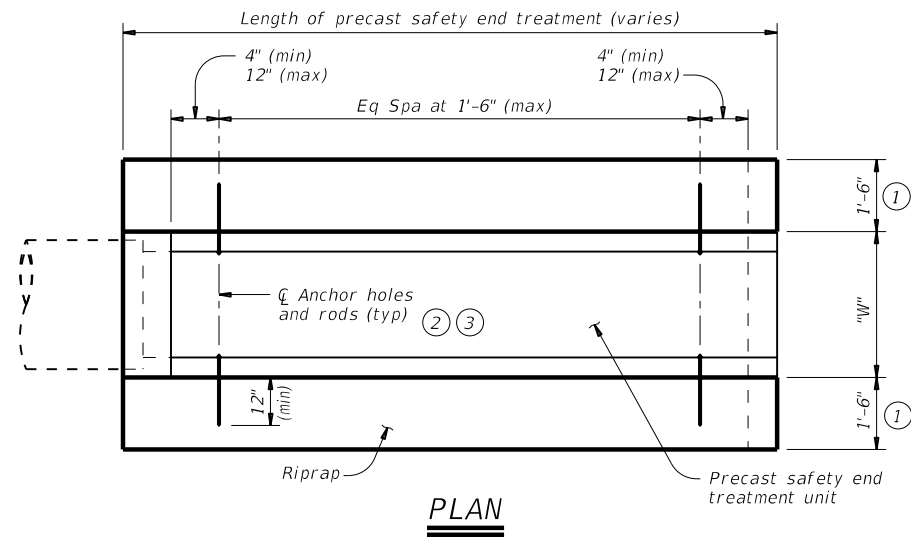
Bridge Division Standard

SAFETY END TREATMENT FOR 0° SKEW BOX CULVERTS (MAXIMUM Hw = 7'-0") TYPE I ~ CROSS DRAINAGE

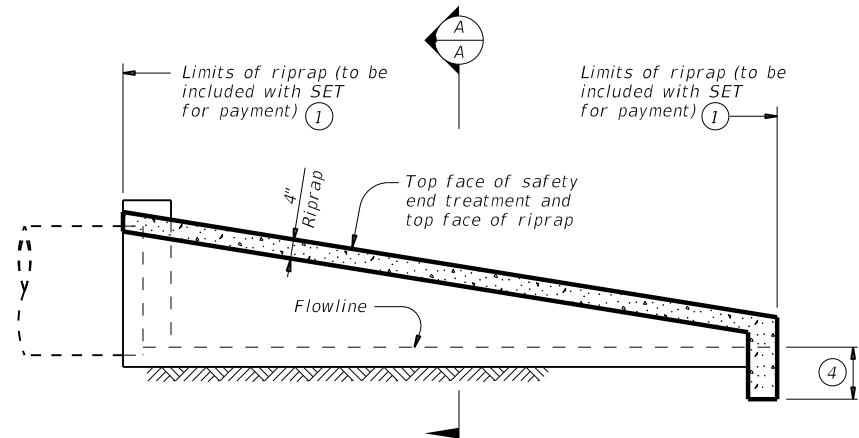
SETB-CD

FILE: setbcdse-20.dgn	DN: GAF	CK: CAT	DW: TXDOT	CK: TXDOT
©TxDOT February 2020	CONT: 020502	SECT: 02	JOB: 067	HIGHWAY: US 79
REVISIONS	DIST: BRY	COUNTY: ROBERTSON	SHEET NO. 49	

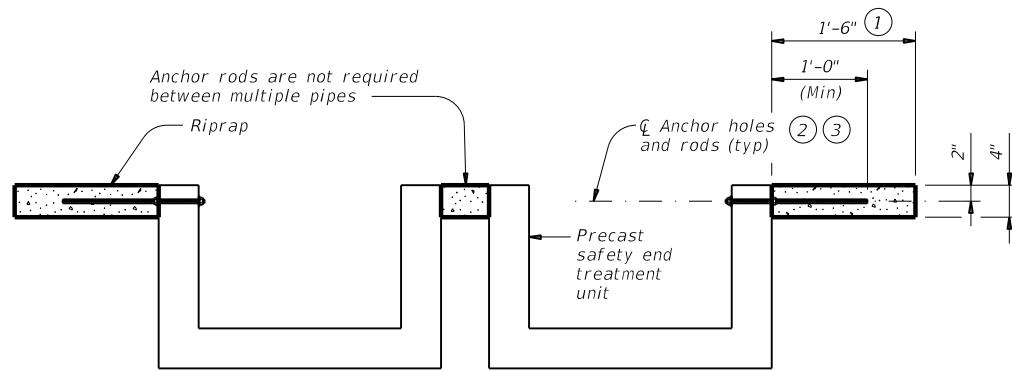
DATE: 8/25/2021 9:23:54 AM
 FILE: \\txdot\project\wiseon\line.com:TXDOT14\Documents\17 - BRY\Design\Project\wiseon\line.com:TXDOT14\Documents\psetrrse-20.dgn
 DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this drawing to any other format.



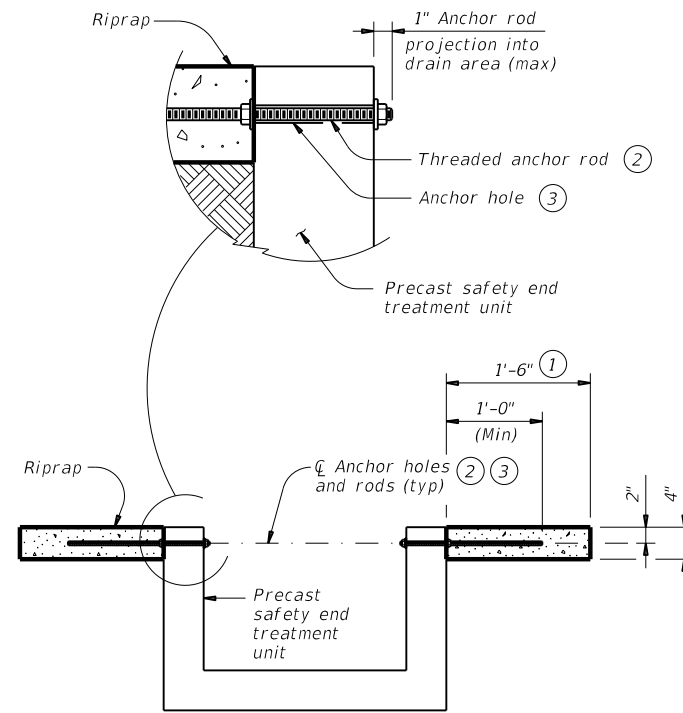
PLAN



LONGITUDINAL ELEVATION



MULTIPLE PIPE INSTALLATION



SINGLE PIPE INSTALLATION

SECTION A-A

ESTIMATED CONCRETE RIPRAP QUANTITIES (CY)

Nominal Culvert (Pipe) I.D.	PSET-SC and PSET-SP Standards					PSET-RC and PSET-RP Standards		
	Unit Width "W"	Side Slope			Unit Width "W"	Side Slope		
		3:1	4:1	6:1		3:1	4:1	6:1
12"	23.0"	0.1	0.2	0.2	16.0"	0.1	0.1	0.2
15"	26.5"	0.2	0.2	0.3	19.5"	0.1	0.2	0.2
18"	30.0"	0.2	0.2	0.3	23.0"	0.2	0.2	0.3
24"	37.0"	0.3	0.3	0.5	30.0"	0.2	0.3	0.4
30"	44.5"	0.3	0.4	0.6	37.0"	0.3	0.3	0.5
36"	51.5"	0.4	0.5	0.7	44.0"	0.3	0.4	0.6
42"	58.5"	0.5	0.6	0.8	51.0"	0.4	0.5	0.7

- ① Riprap placed beyond the limits shown will be paid as concrete riprap in accordance with Item 432, "Riprap". When riprap is cast integrally with the precast safety end treatment, this dimension is 1'-0" minimum.
- ② 1#2" Dia ASTM A307 Gr A threaded anchor rod with 2 nuts and 2 washers. Galvanize all components in accordance with Item 445, "Galvanizing". Repair galvanizing that is damaged during transport or construction in accordance with the specifications.
- ③ 3#4" through holes in walls of safety end treatment for riprap anchor rods may be drilled with rotary (coring or masonry) type drilling equipment or may be formed. Do not use percussive (star) type drilling equipment. If holes are drilled, patch spalls in the inside face of the wall exceeding 1#2" from the holes.
- ④ Provide riprap toe wall when dimension is shown elsewhere in the plans or when field conditions require a toe wall.
- ⑤ Quantities shown are for one end of one reinforced concrete pipe culvert. For multiple pipe culverts, quantities will need to be adjusted. Riprap quantities are for Contractor's information only. Quantities are based on the minimum unit lengths shown on the Precast Safety End Treatment (SET) standard sheets.

MATERIAL NOTES:

Provide Class "B" riprap in accordance with Item 432, "Riprap". Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise. The anchor rods shown are always required.

GENERAL NOTES:

Precast safety end treatment for reinforced concrete pipe may be used for TYPE II end treatment as specified in Item 467, "Safety End Treatment". Refer to PSET-SC or PSET-SP standard sheets for details of square safety end treatments not shown. Refer to PSET-RC or PSET-RP standard sheets for details of round safety end treatments not shown. For precast units with integrally cast riprap, substitute reinforcing steel in the amount on 0.26 in./ft. minimum for the threaded anchor rods shown. When requested, submit sealed engineering drawings for approval prior to construction. Shop drawings will not be required. Note that a proprietary precast unit with integral riprap is available from L&R Precast Concrete Works, Inc. (956) 583-6293 or www.lrpccast.com. Payment for riprap and toewalls is included in the price bid for each safety end treatment.

These riprap details are only applicable when notes that require placement of riprap with precast safety end treatments are shown elsewhere in the plans.

Precast units with integrally cast riprap are permitted unless noted otherwise on the plans.

				Bridge Division Standard	
PRECAST SAFETY END TREATMENT TYPE II RIPRAP DETAILS PSET-RR					
FILE: psetrrse-20.dgn	DN: GAF	CK: TxDOT	DW: JRP	CK: GAF	
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0205	02	067	US 79	
	DIST	COUNTY	SHEET NO.		
	BRY	ROBERTSON	53		

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to any other format.

DATE: 08/24/2021 09:24:50 AM
 FILE: PROJECT\NAME\OBJECT\WISCONSIN\INE.COM\TXDOT4\Documents\17 - BRY\Design\Project\Images\503\ProjectStandards\bcstde1-20.dgn

Culvert Station and/or Creek Name followed by applicable end (Lt, Rt or Both)	Description of Box Culvert No. Spans ~ Span X Height	Max Fill Height (Ft)	Applicable Box Culvert Standard (4)	Applicable Wingwall or End Treatment Standard	Skew Angle (0°, 15°, 30° or 45°)	Side Slope or Channel Slope Ratio (SL:1)	T Culvert Top Slab Thickness (In)	U Culvert Wall Thickness (In)	C Estimated Curb Height (Ft)	Hw (1) Height of Wingwall (Ft)	A Curb to End of Wingwall (Ft)	B Offset of End of Wingwall (Ft)	Lw Length of Longest Wingwall (Ft)	Ltw Culvert Toewall Length (Ft)	Atw Anchor Toewall Length (Ft)	Riprap Apron (CY)	Class "C" Conc (Curb) (CY) (2)	Class "C" Conc (Wingwall) (CY) (3)	Total Wingwall Area (SF)
128+00 Rt (Cast-in-place option)	1~3' x3'	3'	SCC-3&4	SETB-CD	0°	3:1	8"	7"	0.5	3.917	N/A	N/A	10.750	N/A	4.167	0.0	0.1	2.1	N/A
128+00 Lt (Cast-in-place option)	1~3' x3'	3'	SCC-3&4	SETB-CD	0°	4:1	8"	7"	0.5	3.917	N/A	N/A	14.333	N/A	4.167	0.0	0.1	2.7	N/A
128+00 Rt (Precast option)	1~3' x3'	3'	SCP-3	SETB-CD	0°	3:1	4"	4"	0.5	3.583	N/A	N/A	9.750	N/A	4.167	0.0	0.1	1.8	N/A
128+00 Lt (Precast option)	1~3' x3'	3'	SCP-3	SETB-CD	0°	4:1	4"	4"	0.5	3.583	N/A	N/A	13.000	N/A	12.5	0.0	0.2	6.0	N/A

NOTES:

Skew = 0° on SW-0, FW-0, SETB-CD, SETB-SW-0, and SETB-FW-0 standard sheets;
30° maximum for safety end treatment

SL:1 = Horizontal : 1 Vertical

- Side slope at culvert for flared or straight wingwalls.
- Channel slope for parallel wingwalls.
- Slope must be 3:1 or flatter for safety end treatments.

T = Box culvert top slab thickness. Dimension can be found on the applicable box culvert standard sheet.

U = Box culvert wall thickness. Dimension can be found on the applicable box culvert standard sheet.

C = Curb height

See applicable wing or end treatment standard sheets for calculations of Hw, A, B, Lw, Ltw, Atw, and Total Wingwall Area.

Hw = Height of wingwall

A = Distance from face of curb to end of wingwall (not applicable to parallel or straight wingwalls)

B = Offset of end of wingwall (not applicable to parallel or straight wingwalls)

Lw = Length of longest wingwall.

Ltw = Length of culvert toewall (not applicable when using riprap apron)

Atw = Length of anchor toewall (applicable to safety end treatment only)

Total Wingwall Area = Wingwall area in sq. ft. for two wingwalls (one structure end) if Lt or Rt.
Area for four wingwalls (two structure ends) if Both.

- Round the wall heights shown to the nearest foot for bidding purposes.
- Concrete volume shown is for box culvert curb only. For curbs using the Box Culvert Rail Mounting Details (RAC) standard sheet quantities shown must be increased by a factor of 2.25. If Class S concrete is required for the top slab of the culvert, also provide Class S concrete for the curb. Curb concrete is considered part of the Box Culvert for payment.
- Concrete volume shown is total of wings, footings, culvert toewall (if any), anchor toewalls (if any) and wingwall toewalls. Riprap aprons, culverts, and curb quantities are not included.
- Regardless of the type of culvert shown on this sheet, the Contractor has the option of furnishing cast-in-place or precast culverts unless otherwise shown elsewhere on the plans. If the Contractor elects to provide culverts of a different type than those shown on this sheet, it is the Contractor's responsibility to make the necessary adjustments to the dimensions and quantities shown.

SPECIAL NOTE:

This sheet is a supplement to the box culvert standards. It is to be filled out by the culvert specifier and provides dimensions for the construction of the box culvert wingwalls and safety end treatments.

An Excel 2010 spreadsheet to assist in completing this table can be downloaded from the Bridge Standards (English) web page on the TxDOT web site. The completed sheet must be signed, sealed, and dated by a licensed Professional Engineer.

				Bridge Division Standard	
<h2>BOX CULVERT SUPPLEMENT</h2> <h3>WINGS AND END TREATMENTS</h3>					
BCS					
FILE:	bcstde1-20.dgn	DN:	TxDOT	CK:	TxDOT
REV:	0205 02	JOB:	067	HS:	79
DIST:	BRY	COUNTY:	ROBERTSON	SHEET NO.:	53A

REV DATE: 2-12-2015
 CSJ: XXXX-XX-XXX
 FILENAME: p:\projects\project\issueline.com\TxDOT\4\Documents\17 - RRY\Design Projects\0205020674 - Design\Plan Set\8 - Traffic\Plan Set\8 - Signing\Layout\Signing\Striping

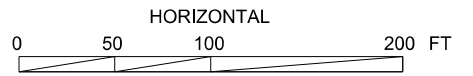
LEGEND	
(A)	(W)(4")(SLD)
(B)	(Y)(4")(SLD)
(C)	(W)(8")(SLD)
(D)	(W)(8")(DOT)
(E)	(W)(24")(SLD)
(F)	PAVEMENT MARKER TYPE II-A-A
(G)	PAVEMENT MARKER TYPE I-C
(H)	REMOVE SMALL SIGN
(I)	INSTALL SMALL SIGN
(J)	(Y)(24")(SLD)
D	DOUBLE WHITE DELINEATOR (D-DY)
D	DOUBLE YELLOW DELINEATOR (D-DW)
D	SINGLE WHITE DELINEATOR (D-SW)
D	SINGLE YELLOW DELINEATOR (D-SY)
□	OBJECT MARKER (OM-2)
▨	OBJECT MARKER (OM-3)

GENERAL NOTES:



Timothy Tyler Thomason

8/25/2021

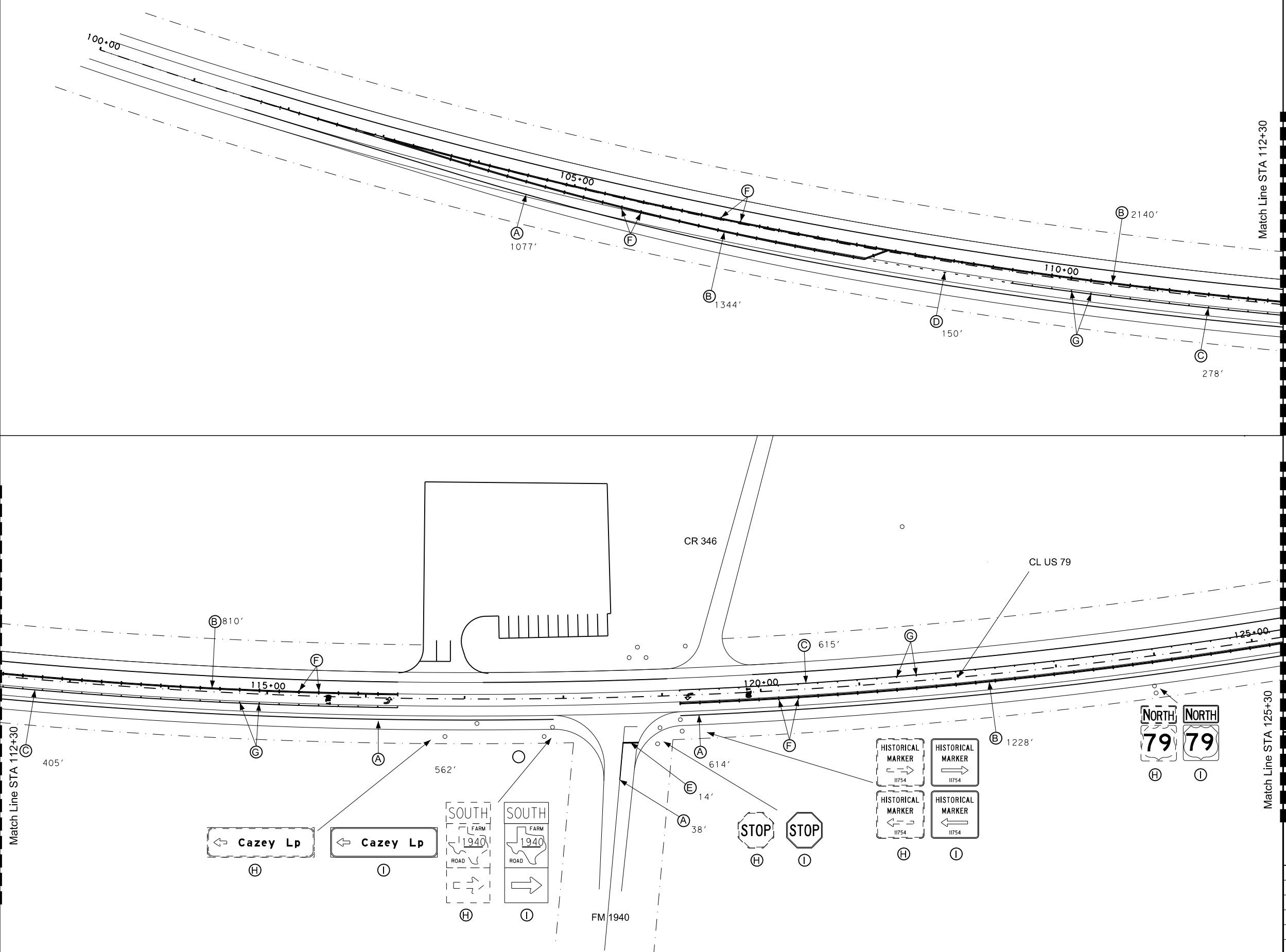


PRINT DATE	REVISION DATE
8/25/2021	



SIGNING & STRIPING LAYOUT
 SHEET 1 OF 2

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER	
6	F 2022(117)	US 79	
STATE	DISTRICT	COUNTY	
TEXAS	BRYAN	ROBERTSON	
CONTROL	SECTION	JOB	SHEET NO.
0205	02	067	54

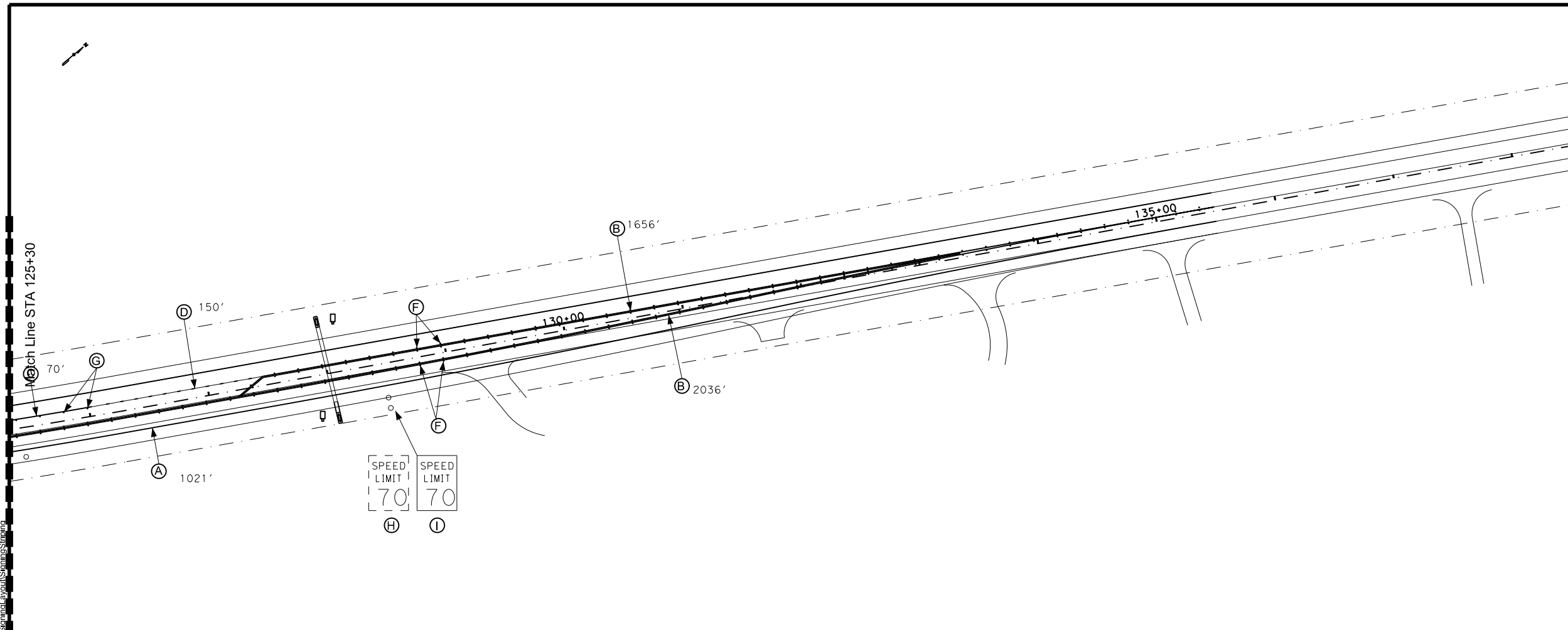


Match Line STA 112+30

Match Line STA 112+30

Match Line STA 125+30

REV DATE: 2-12-2015
 CSJ: XXXX-XX-XXX
 FILENAME: p:\t\tdot\project\wiseonline.com\t\DOT4\Documents\17 - BRY\Design Projects\02050206714 - Design\Plan Set\8 - Traffic\8D - Signing\Layout\Signing\Striping



LEGEND	
(A)	(W)(4")(SLD)
(B)	(Y)(4")(SLD)
(C)	(W)(8")(SLD)
(D)	(W)(8")(DOT)
(E)	(W)(24")(SLD)
(F)	PAVEMENT MARKER TYPE II-A-A
(G)	PAVEMENT MARKER TYPE I-C
(H)	REMOVE SMALL SIGN
(I)	INSTALL SMALL SIGN
(J)	(Y)(24")(SLD)
D	DOUBLE WHITE DELINEATOR (D-DY)
D	DOUBLE YELLOW DELINEATOR (D-DW)
D	SINGLE WHITE DELINEATOR (D-SW)
D	SINGLE YELLOW DELINEATOR (D-SY)
□	OBJECT MARKER (OM-2)
▨	OBJECT MARKER (OM-3)

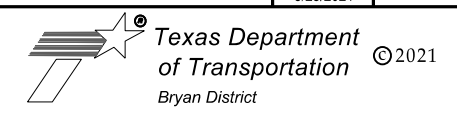
GENERAL NOTES:



Timothy Tyler Thomason

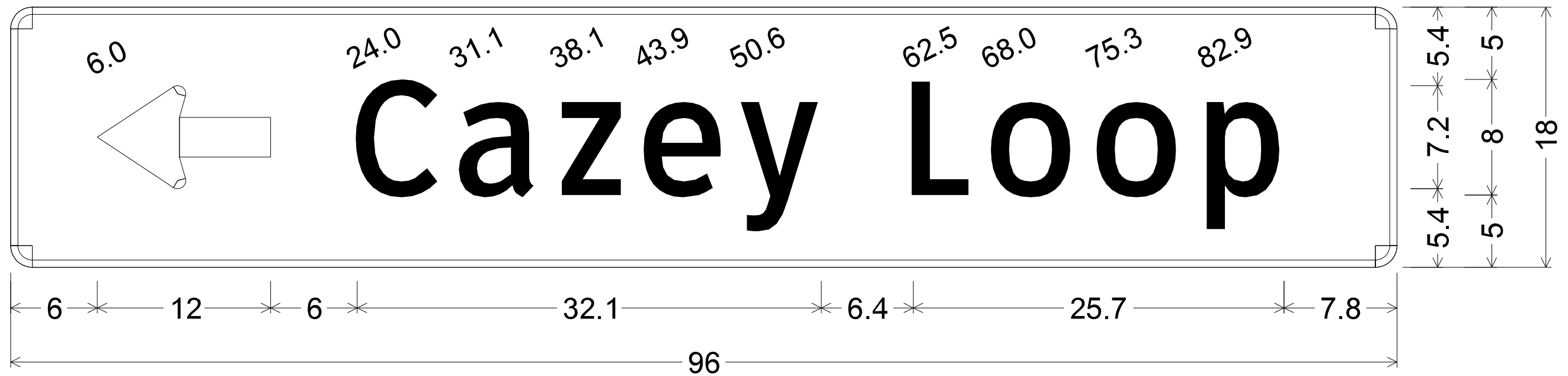
8/25/2021

PRINT DATE	REVISION DATE
8/25/2021	



SIGNING & STRIPING LAYOUT
 SHEET 2 OF 2

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER	
6	F 2022(117)	US 79	
STATE	DISTRICT	COUNTY	
TEXAS	BRYAN	ROBERTSON	
CONTROL	SECTION	JOB	SHEET NO.
0205	02	067	55




D1-1 8in LT;
 1.5" Radius, 0.5" Border, White on, Green;
 Standard Arrow Custom 12.0" X 7.1" 180'; "Cazey Loop", ClearviewHwy-3-W;

REV DATE: 2-12-2015
 CSI: XXXX-XX-XXX
 FILENAME: \$FILES

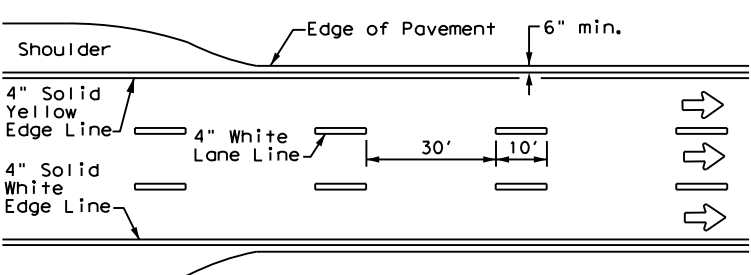


Timothy Tyler Thomason

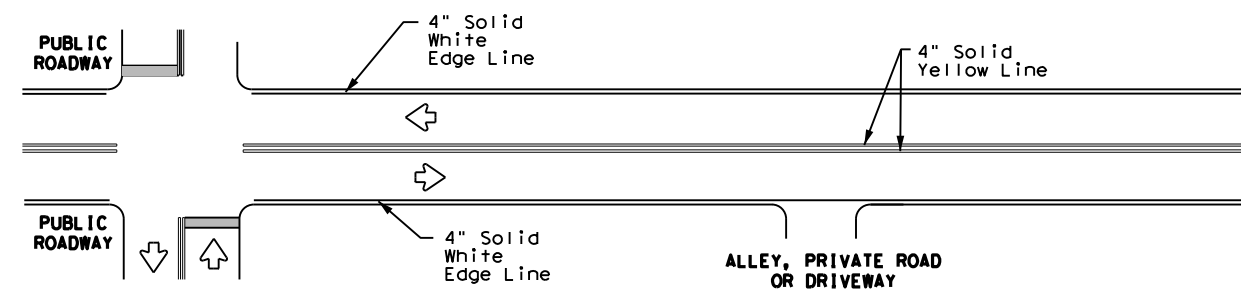
8/25/2021

PRINT DATE		REVISION DATE	
SDATES			
 Texas Department of Transportation ©2021 Bryan District			
SIGN DETAILS			
FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER	
6	SFPNS	US 79	
STATE	DISTRICT	COUNTY	
TEXAS	BRYAN	ROBERTSON	
CONTROL	SECTION	JOB	SHEET NO.
0205	02	067	56

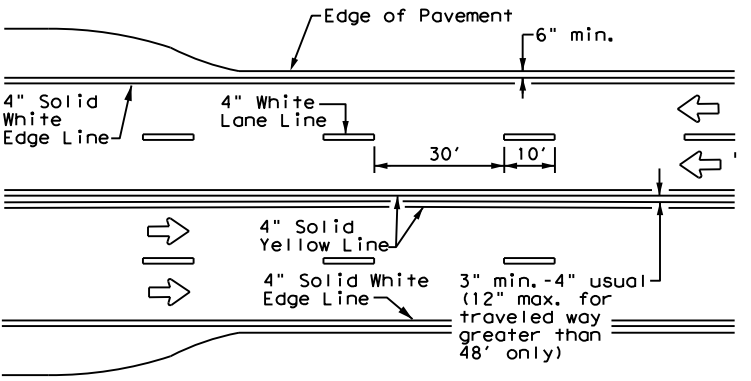
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of units or for the use of this standard in any other manner than that intended for its use.



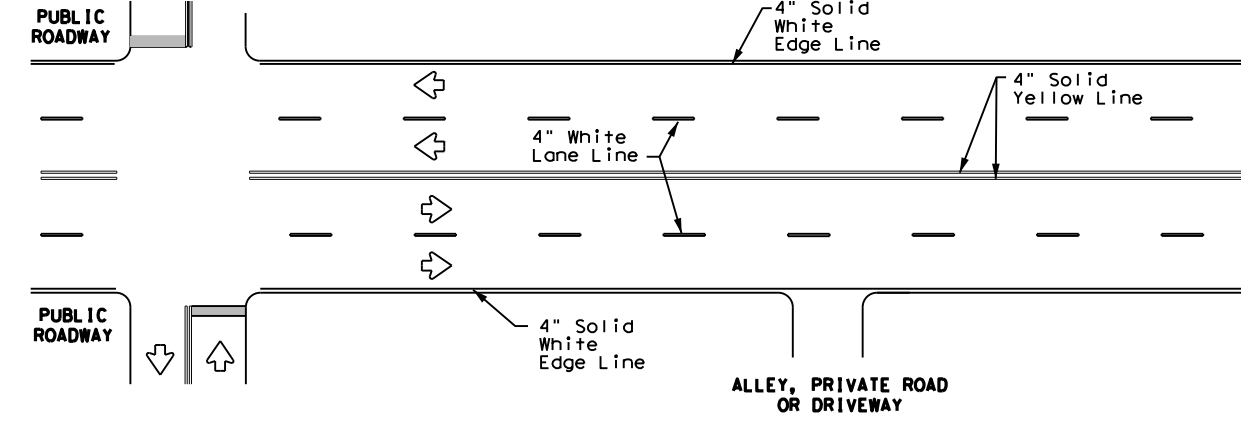
**EDGE LINE AND LANE LINES
ONE-WAY ROADWAY
WITH OR WITHOUT SHOULDERS**



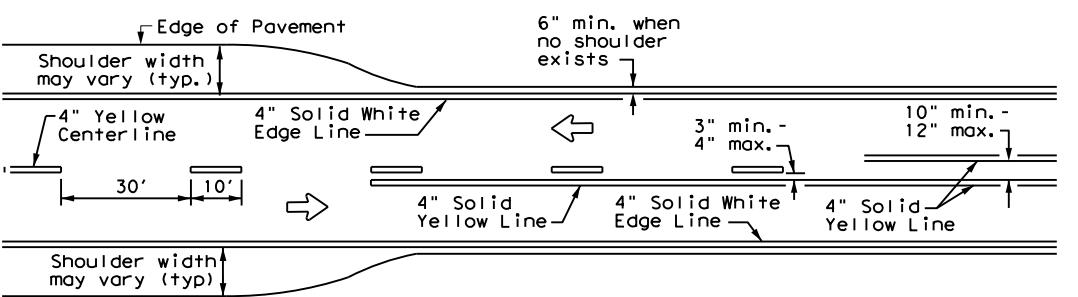
**TYPICAL TWO-LANE, TWO-WAY PAVEMENT
MARKINGS THROUGH INTERSECTIONS**



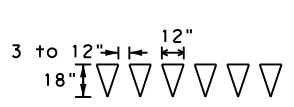
**CENTERLINE AND LANE LINES
FOUR LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS**



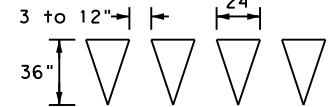
**TYPICAL MULTI-LANE, TWO-WAY PAVEMENT
MARKINGS THROUGH INTERSECTIONS**



**TWO LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS**



For posted speed on road being marked equal to or less than 40 MPH.



For posted speed on road being marked equal to or greater than 45 MPH.

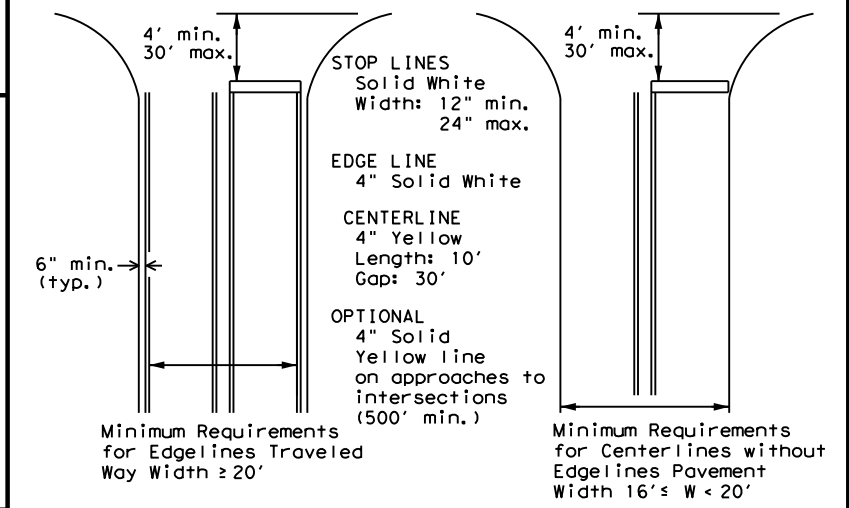
YIELD LINES

GENERAL NOTES

1. Edgeline striping shall be as shown in the plans or as directed by the Engineer. The edgeline should not be placed less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edgelines are not required in curb and gutter sections of roadways.
2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the inside of edgeline to the inside of edgeline of a two lane roadway.

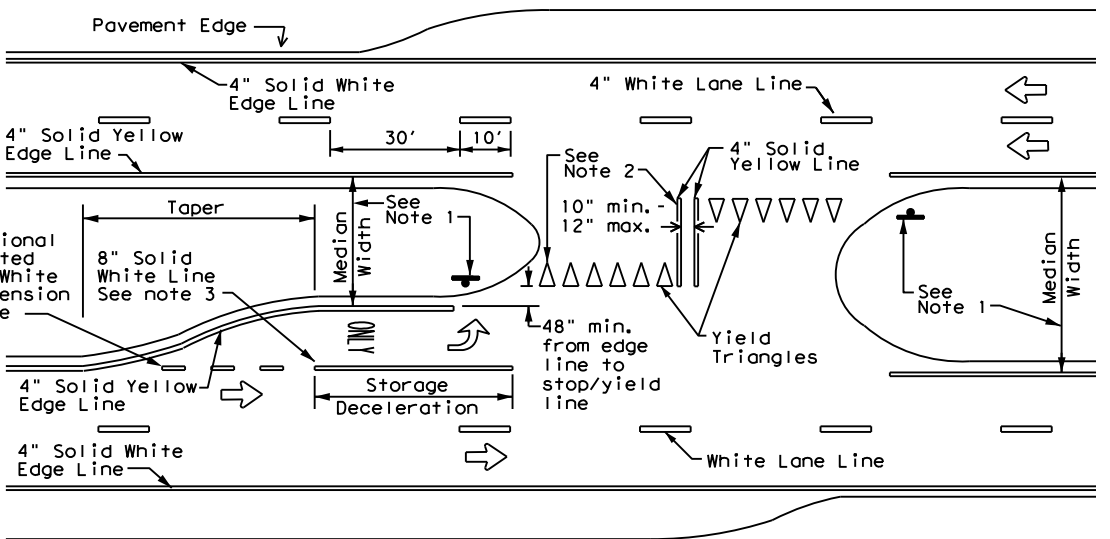
MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



**GUIDE FOR PLACEMENT OF STOP LINES,
EDGE LINE & CENTERLINE**

Based on Traveled Way and Pavement Widths for Undivided Highways



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs are optional as determined by the Engineer.
2. Install median striping (double yellow centerlines and stop bars/yield triangles) when a 50' or greater median centerline can be placed. Stop bars shall only be used with stop signs. Yield triangles shall only be used with yield signs.
3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown in the plans or as directed by the Engineer.



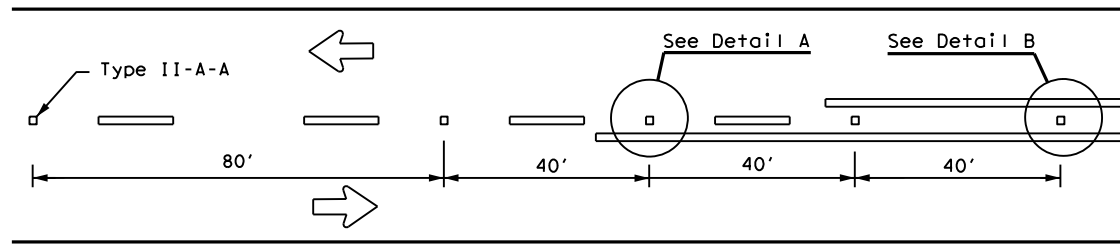
**TYPICAL STANDARD
PAVEMENT MARKINGS**

PM(1) - 20

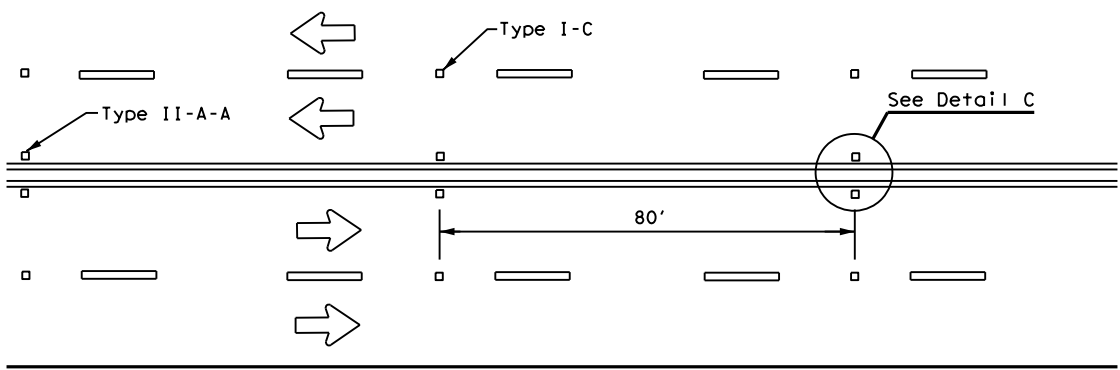
FILE: pm1-20.dgn	DW: CK:	DW: CK:	CK:
© TxDOT November 1978	CONT SECT	JOB	HIGHWAY
8-95 3-03 REVISIONS	0205 02	067	US 79
5-00 2-12	DIST	COUNTY	SHEET NO.
8-00 6-20	BRY	ROBERTSON	57

REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

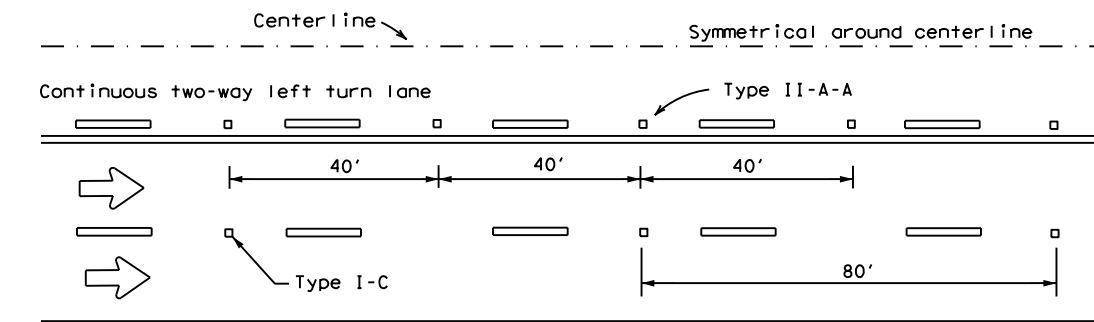
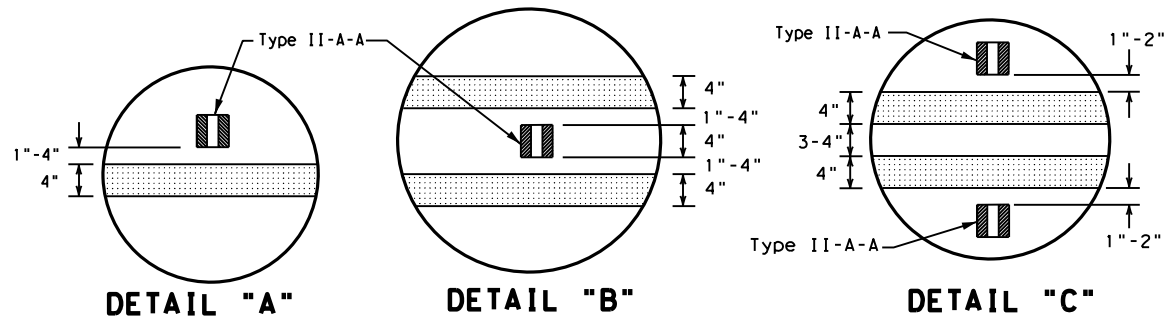
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of units or for the use of this standard for any purpose other than that for which it was originally intended.



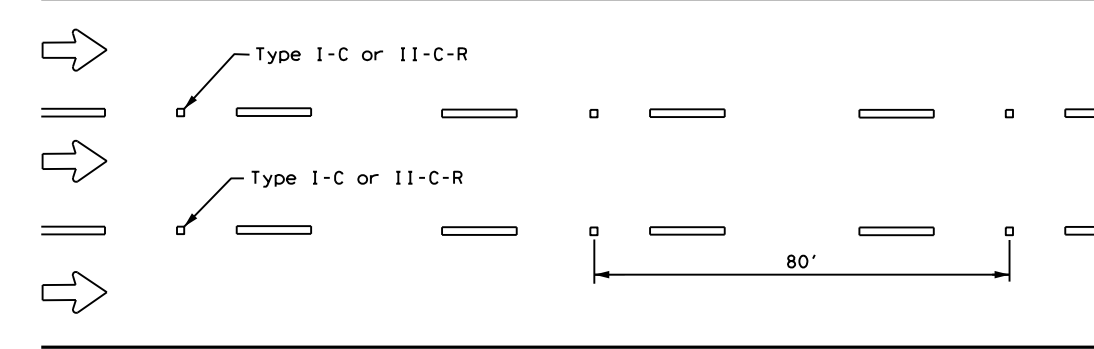
CENTERLINE FOR ALL TWO LANE ROADWAYS



**CENTERLINE & LANE LINES
FOR FOUR LANE TWO-WAY HIGHWAYS**



CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE

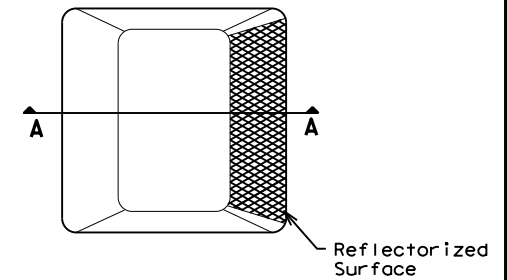


LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

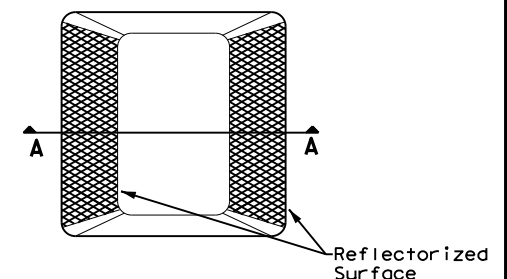
Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

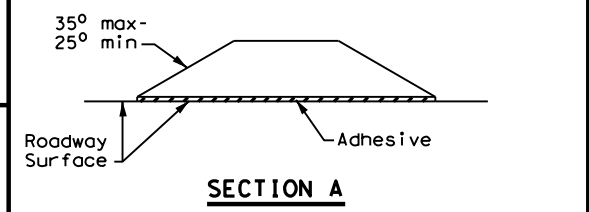
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



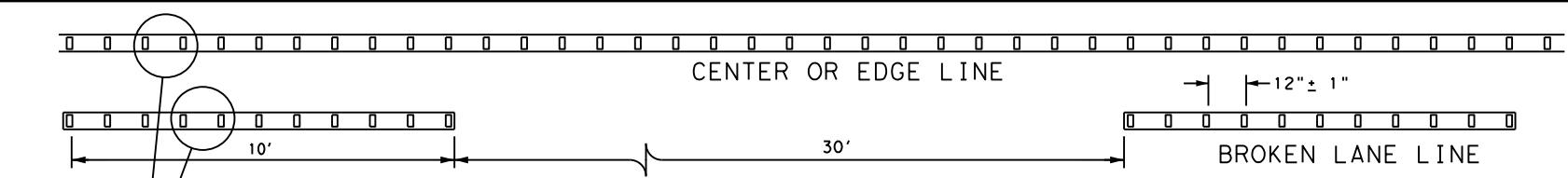
Type II (Top View)



RAISED PAVEMENT MARKERS

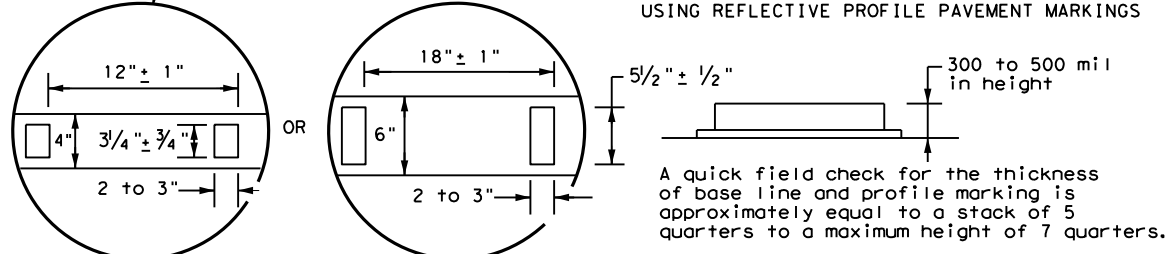
GENERAL NOTES

- All raised pavement markers placed in broken lines shall be placed in line with and midway between the stripes.
- On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.



**REFLECTORIZED PROFILE
PATTERN DETAIL**

USING REFLECTIVE PROFILE PAVEMENT MARKINGS



NOTE

Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

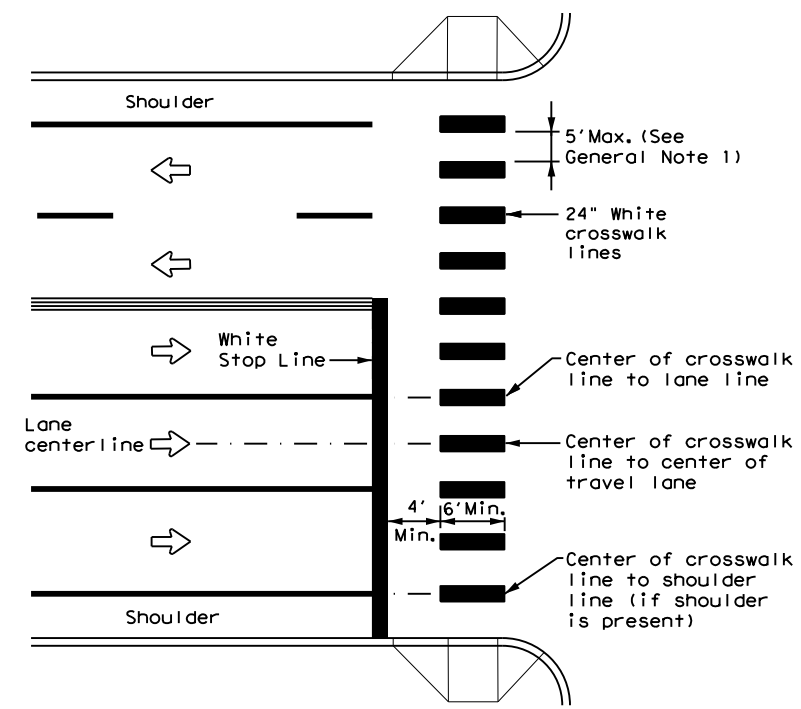
Traffic Safety Division Standard

POSITION GUIDANCE USING RAISED MARKERS REFLECTORIZED PROFILE MARKINGS PM(2) - 20

FILE: pm2-20.dgn	DN:	CK:	DW:	CK:
© TxDOT April 1977	CONT	SECT	JOB	HIGHWAY
4-92 2-10 REVISIONS	0205	02	067	US 79
5-00 2-12	DIST	COUNTY		SHEET NO.
8-00 6-20	BRY	ROBERTSON		58

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to metric units or for any other use of this standard.

DATE: 8/25/2021 9:25:15 AM
 FILE: \\txdot.projectwiseonline.com:TXDOT14\Documents\17 - BRY\Design Projects\170802087\020802087.dwg



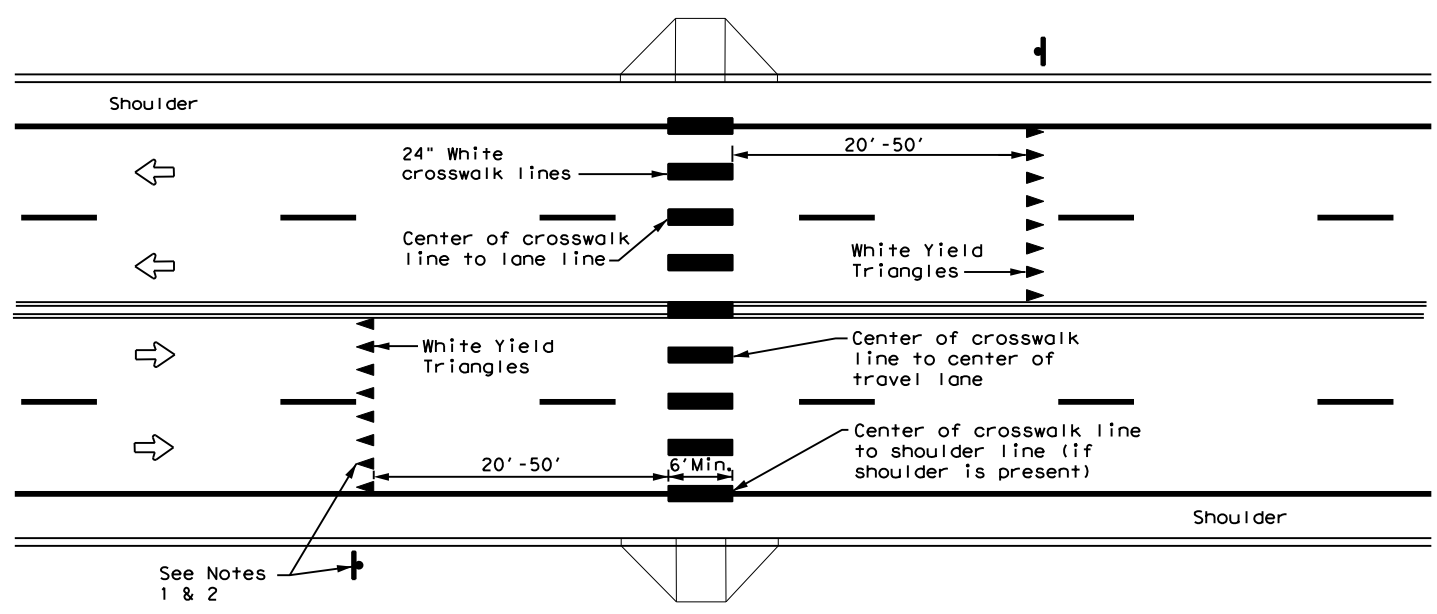
HIGH-VISIBILITY LONGITUDINAL CROSSWALK AT CONTROLLED APPROACH

GENERAL NOTES

1. Longitudinal crosswalk lines should not be placed in the wheel path of vehicles. Center the crosswalk lines on travel lanes, lane lines, and shoulder lines (if present).
2. A minimum 6" clear distance shall be provided to the curb face. If the last crosswalk line falls into this distance it must be omitted.
3. For divided roadways, adjustments in spacing of the crosswalk lines should be made in the median so that the crosswalk lines are maintained in their proper location across the travel portion of the roadway.
4. At skewed crosswalks, the crosswalk lines are to remain parallel to the lane lines.
5. Each crosswalk shall be a minimum of 6' wide.
6. The High-Visibility Longitudinal Crosswalk is the preferred crosswalk pattern on State Highways. Other crosswalk patterns as shown in the "Texas Manual on Uniform Traffic Control Devices" may be used. All crosswalk designs and dimension shall comply with the "Texas Manual on Uniform Traffic Control Devices."
7. Final placement of Stop Bar/Yield Triangles and Crosswalk shall be approved by the Engineer in the field.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



UNSIGNALIZED MID BLOCK HIGH-VISIBILITY LONGITUDINAL CROSSWALK

NOTES

1. Use yield triangles with "Yield Here to Pedestrians" signs at unsignalized mid block crosswalks.
2. Use stop bars with "Stop Here on Red" signs at mid block crosswalks controlled by traffic signals or pedestrian hybrid beacons.

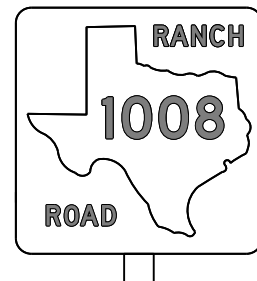
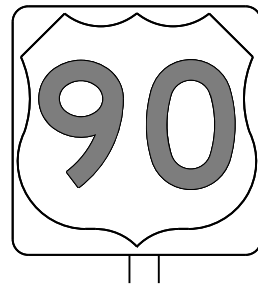
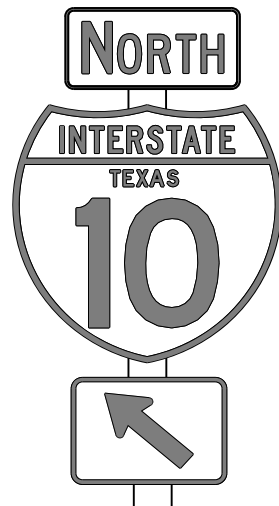
<p>CROSSWALK PAVEMENT MARKINGS</p> <p>PM(4) - 20</p>			
FILE: pm4-20.dgn	DN:	CK:	DW:
© TxDOT June 2020	CONT	SECT	JOB
REVISIONS	0205	02	067
DIST	COUNTY		SHEET NO.
BRY	ROBERTSON		60

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of units or for the use of this standard in any project. For more information, contact TxDOT at 512.463.1000 or visit the website at www.txdot.gov.

DATE: 8/25/2021 9:25:30 AM
 FILE: \\txdot\project\wiseon\line.com:TXDOT4\Documents\17 - BRY\Design Projects\17-00000000000000000000.dgn

REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

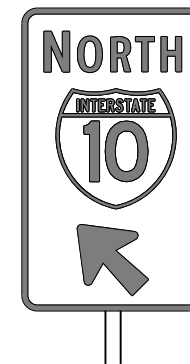
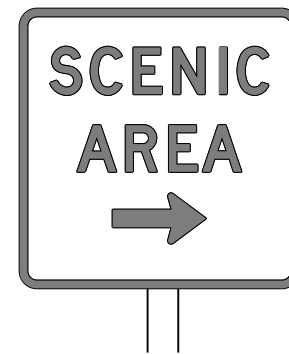
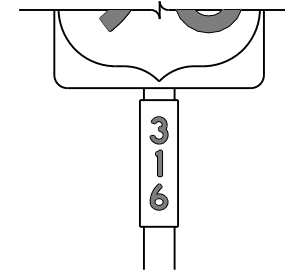
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B OR C SHEETING



TYPICAL EXAMPLES

REQUIREMENTS FOR BLUE, BROWN & GREEN D AND I SERIES GUIDE SIGNS

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	ALL	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE D SHEETING
LEGEND, SYMBOLS & BORDERS	ALL OTHERS	TYPE B OR C SHEETING



TYPICAL EXAMPLES

GENERAL NOTES

- Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
- White legend shall use the Clearview Alphabet. The following Clearview fonts shall be used to replace the existing white Federal Highway Administration (FHWA) Standard Highway Alphabets, when not specified in the SHSD, or in the plans.

B	CV-1W
C	CV-2W
D	CV-3W
E	CV-4W
Emod	CV-5WR
F	CV-6W

- Route sign legend (ie. IH, US, SH and FM shields) shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets B, C, D, E, Emod or F).
- Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.
- Independent mounted route sign with white or colored legend and borders shall be applied by screening process with transparent color ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof. White legend, symbols and borders on all other signs shall be cut-out white sheeting applied to colored background sheeting.
- Information regarding borders and radii for signs is found in the "Standard Highway Sign Designs for Texas". Dimensions shown and described for borders and corner radii on parent sign are nominal. Borders may vary in width as much as 1/2 inch. Corner radii above 3 inches may vary in width as much as 1 inch. Borders and corner radii within a parent sign must be of matching widths. The sign area outside the corner radius should be trimmed or rounded.
- Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
- Mounting details of roadside signs are shown in the "SMD series" Standard Plan Sheets.

DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

<http://www.txdot.gov/>



TYPICAL SIGN REQUIREMENTS

TSR(3) - 13

FILE:	tsr3-13.dgn	DN:	TxDOT	CK:	TxDOT	DW:	TxDOT	CK:	TxDOT
©TxDOT	October 2003	CONT	SECT	JOB	HIGHWAY				
REVISIONS		0205	02	067	US 79				
12-03	7-13	DIST	COUNTY	SHEET NO.					
9-08		BRY	ROBERTSON	63					

DATE: 8/25/2021 9:25:46 AM
 FILE: \\txdot.projectwiseonline.com\TXDOT14\Documents\17 - BRY\Design Projects\020502067\4 - Design\Plan Set\8 - Traffic\Signs\TrafficStandards\smgen.dgn
 DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

SM RD SGN ASSM TY XXXXX(X)XX(X-XXXX)

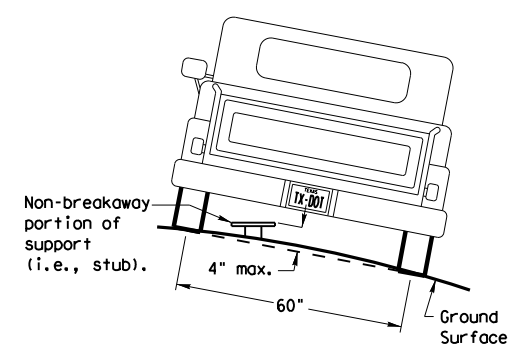
Post Type
 FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
 TWT = Thin-Walled Tubing (see SMD(TWT))
 10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
 S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

Number of Posts (1 or 2)

Anchor Type
 UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))
 UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWT))
 WS = Wedge Anchor Steel - (see SMD(TWT))
 WP = Wedge Anchor Plastic (see SMD(TWT))
 SA = Slipbase - Concreted (see SMD(SLIP-1) to (SLIP-3))
 SB = Slipbase - Bolted Down (see SMD(SLIP-1) to (SLIP-3))

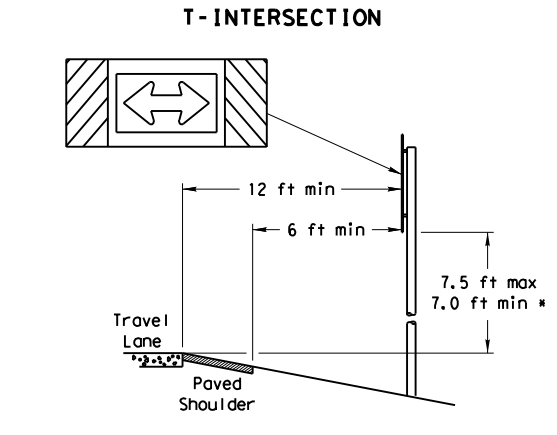
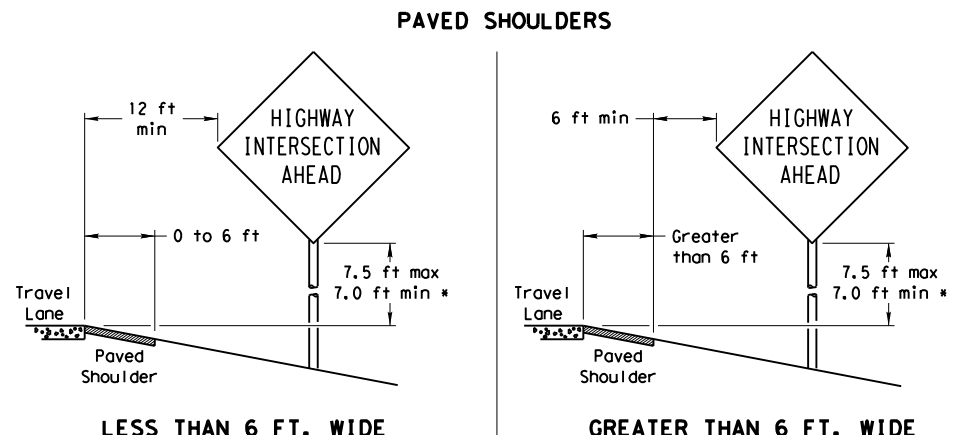
Sign Mounting Designation
 P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
 T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
 U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
 IF REQUIRED
 1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
 BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
 WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
 EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-3))

REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



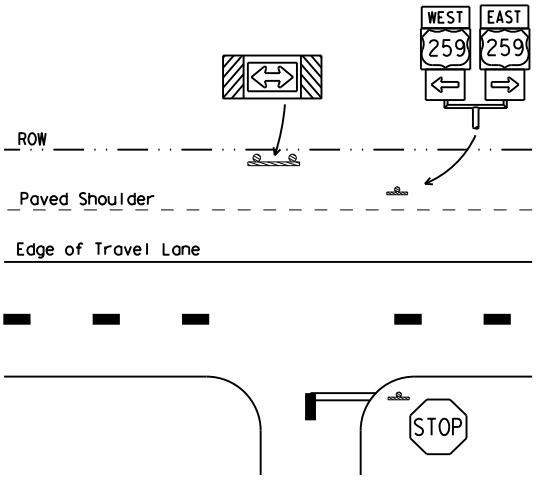
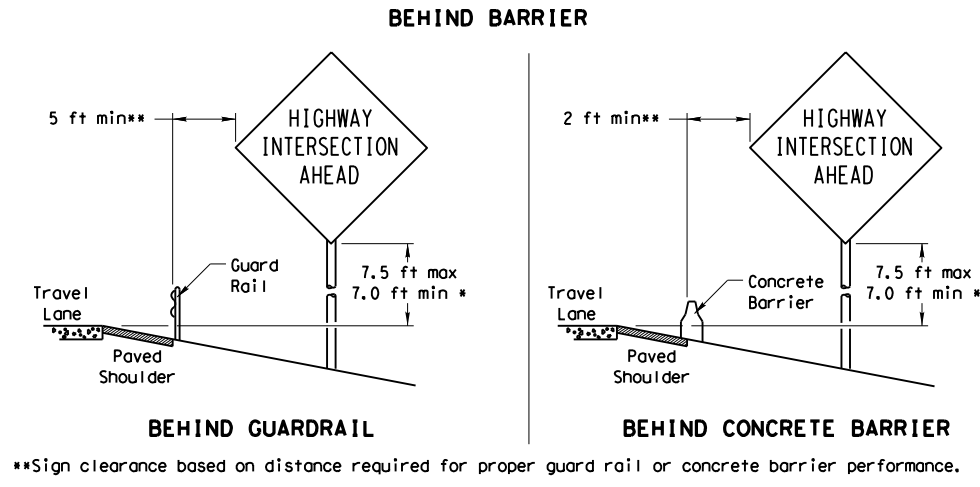
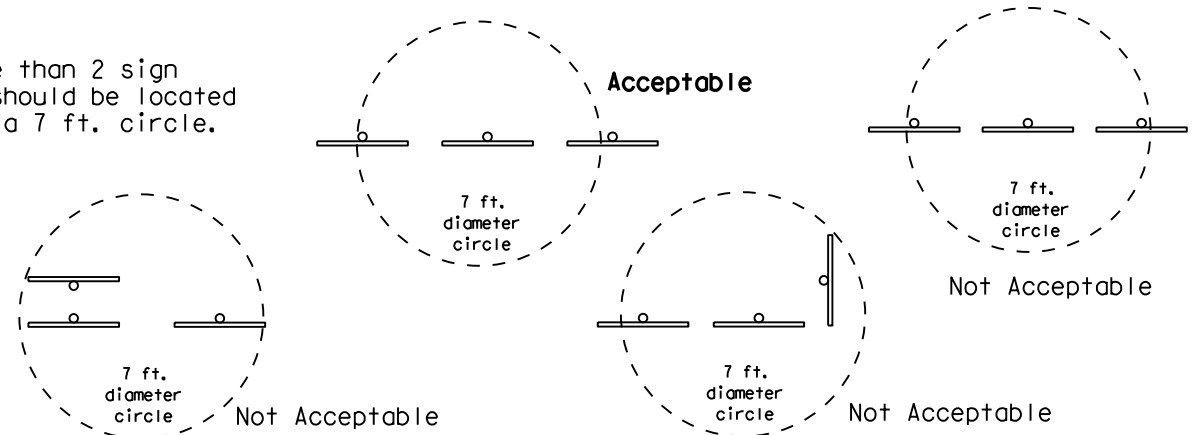
To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

SIGN LOCATION



When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.

No more than 2 sign posts should be located within a 7 ft. circle.



* Signs shall be mounted using the following condition that results in the greatest sign elevation:

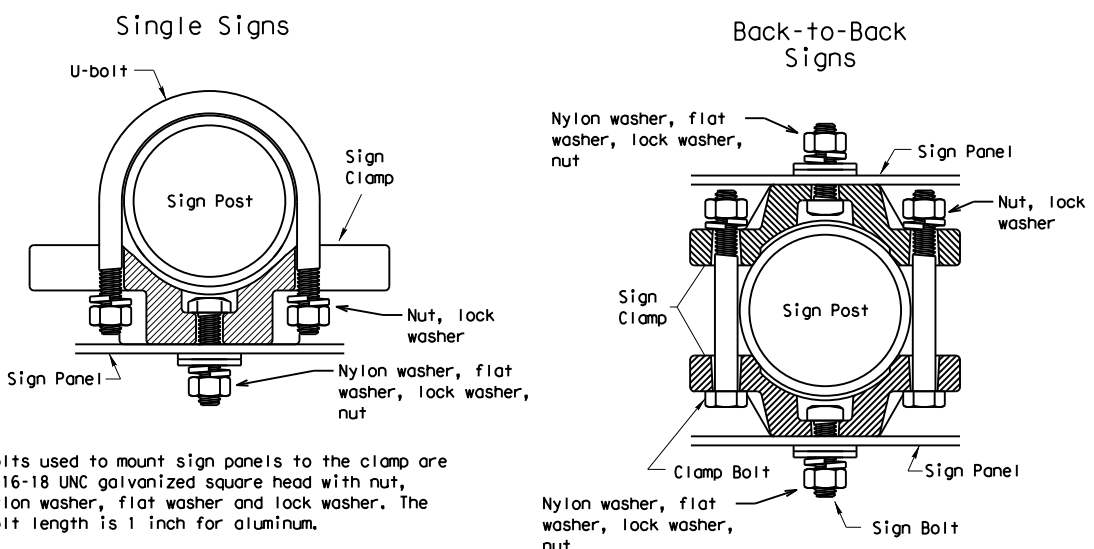
- (1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or
- (2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

The website address is:
<http://www.txdot.gov/publications/traffic.htm>

TYPICAL SIGN ATTACHMENT DETAIL



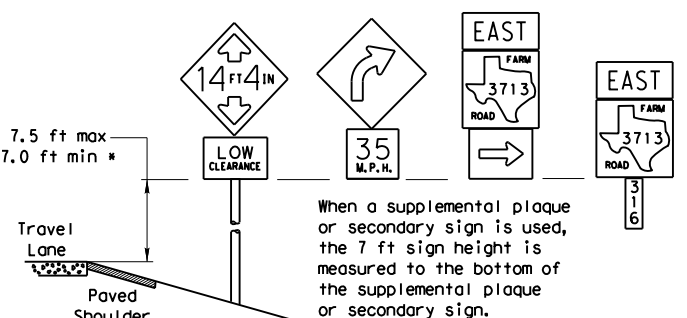
Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

Sign clamps may be either the specific size clamp or the universal clamp.

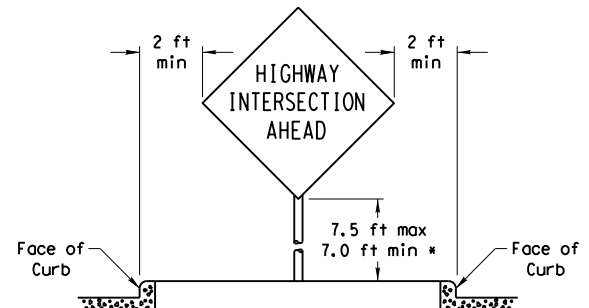
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES

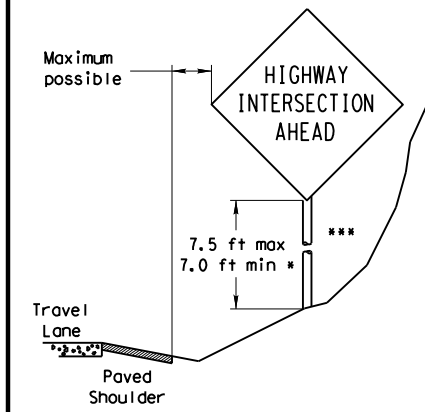


When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY (When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

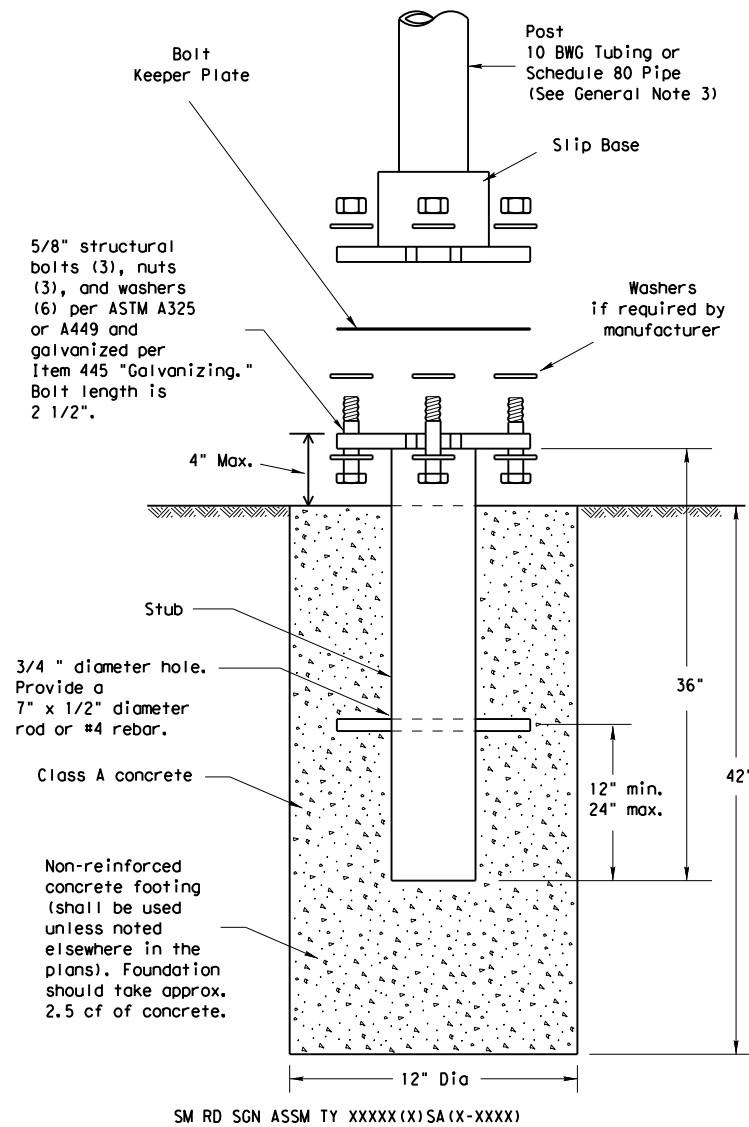
*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.



SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS SMD(GEN) - 08

© TxDOT July 2002		DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	REVISIONS	CONT	SECT	JOB	HIGHWAY
		0205	02	067	US 79
		DIST	COUNTY		SHEET NO.
		BRY	ROBERTSON		66

TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. http://www.txdot.gov/business/producer_list.htm The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

- Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
- Material used as post with this system shall conform to the following specifications:
 - 10 BWG Tubing (2.875" outside diameter)
 - 0.134" nominal wall thickness
 - Seamless or electric-resistance welded steel tubing or pipe
 - Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
 - Other steels may be used if they meet the following:
 - 55,000 PSI minimum yield strength
 - 70,000 PSI minimum tensile strength
 - 20% minimum elongation in 2"
 - Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
 - Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
 - Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.
 - Schedule 80 Pipe (2.875" outside diameter)
 - 0.276" nominal wall thickness
 - Steel tubing per ASTM A500 Gr C
 - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
 - 46,000 PSI minimum yield strength
 - 62,000 PSI minimum tensile strength
 - 21% minimum elongation in 2"
 - Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
 - Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
 - Galvanization per ASTM A123
- See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: <http://www.txdot.gov/publications/traffic.htm>
- Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

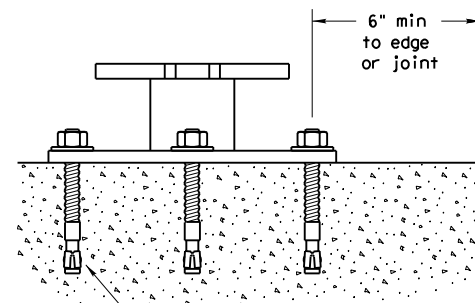
Foundation

- Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
- The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
- Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing it down into the concrete to assure good contact between the concrete and stub. Continue to work the stub into the concrete until it is between 2 to 4 inches above the ground.
- Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
- The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support

- Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
- Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

CONCRETE ANCHOR



5/8" diameter Concrete Anchor - 8 places (embed a minimum of 5 1/2" and torque to min. of 50 ft-lbs). Anchor may be expansion or adhesive type.

SM RD SGN ASSM TY XXXXX(X)SB(X-XXXX)

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxyes and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.

DATE: 8/25/2021 9:25:53 AM
 FILE: \\txdot.projectwiseonline.com:TXDOT14\Documents\17 - BRY\Design Projects\020502067\4 - Design\Plan Set\8 - Traffic\Plan Set\8 - TrafficStandards\smdsl.dgn
 DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

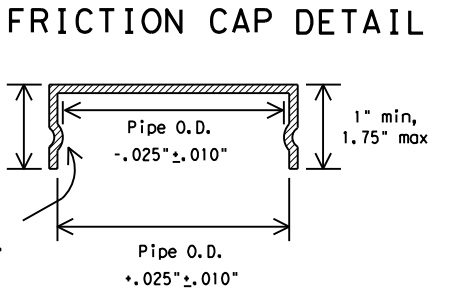
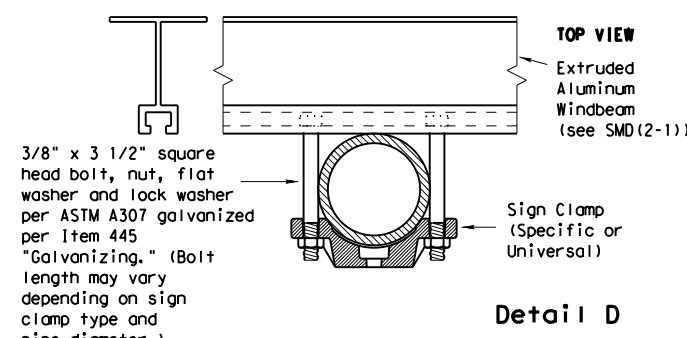
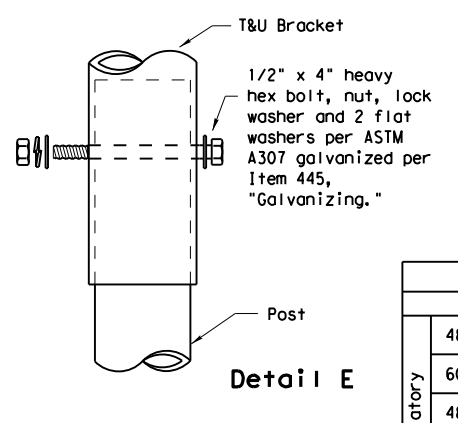
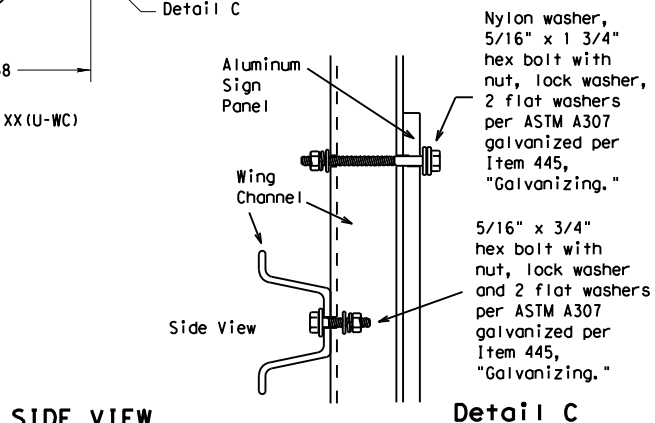
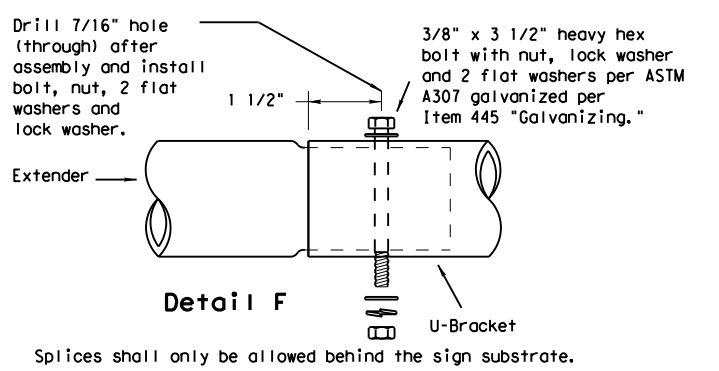
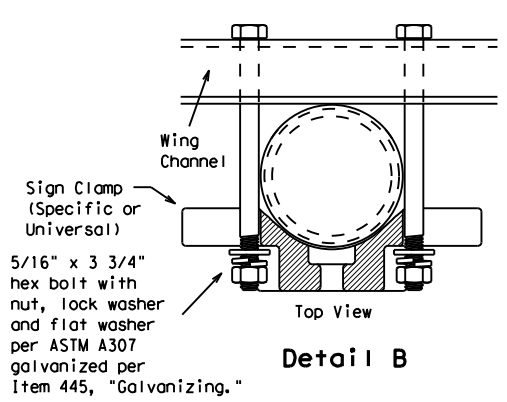
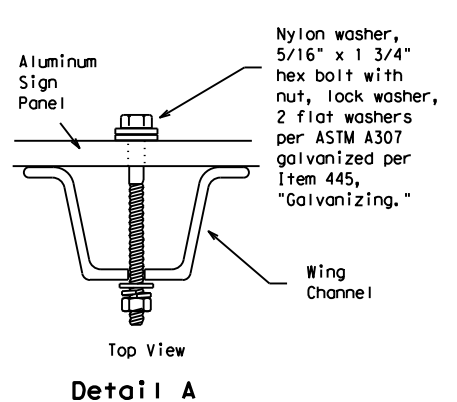
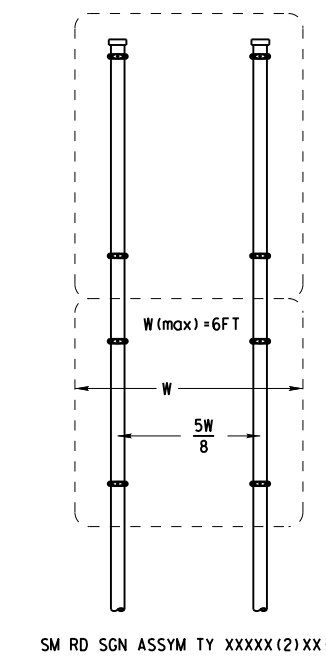
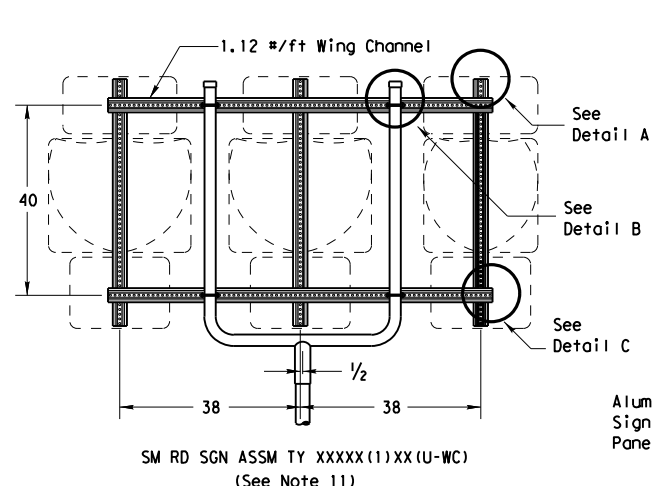
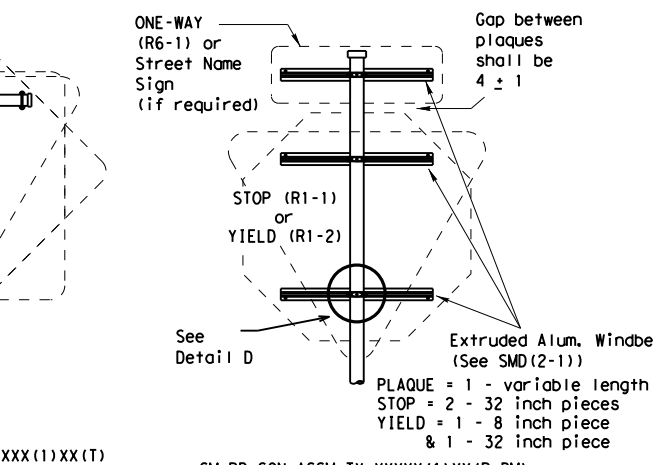
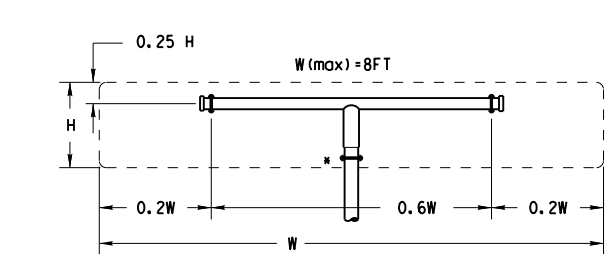
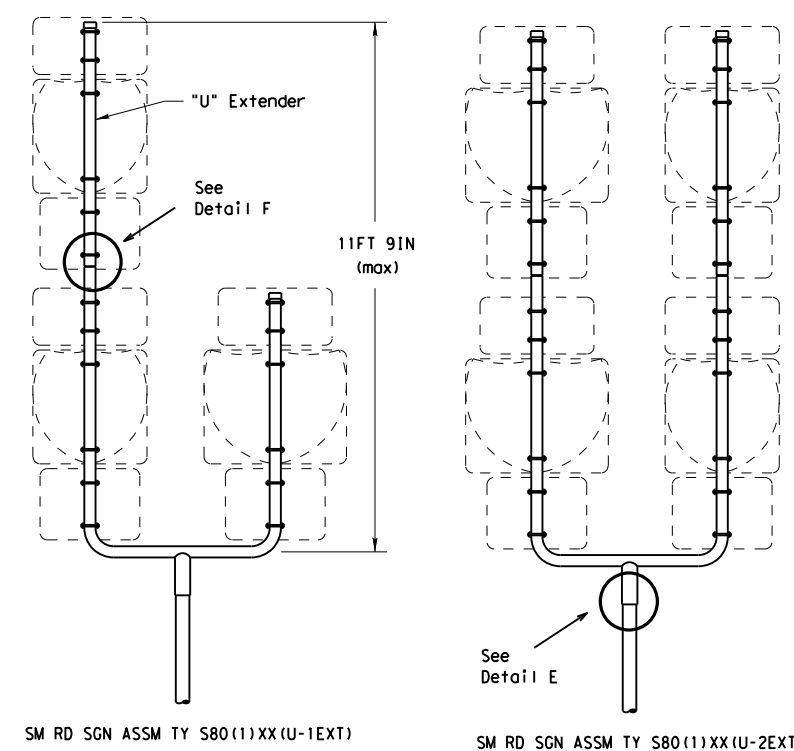
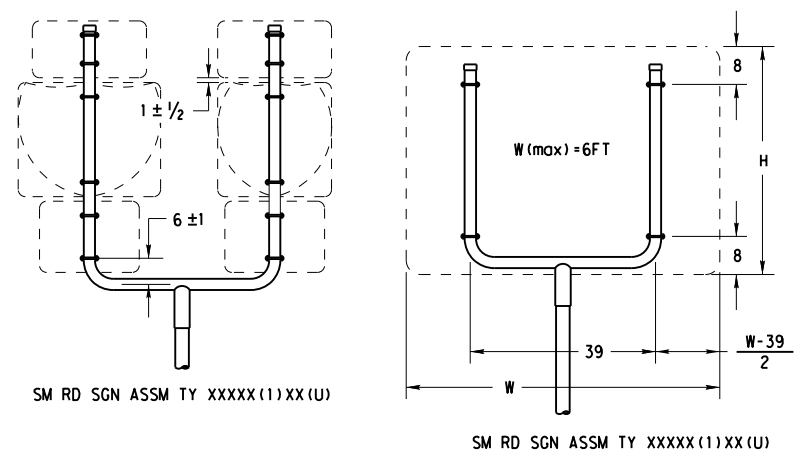
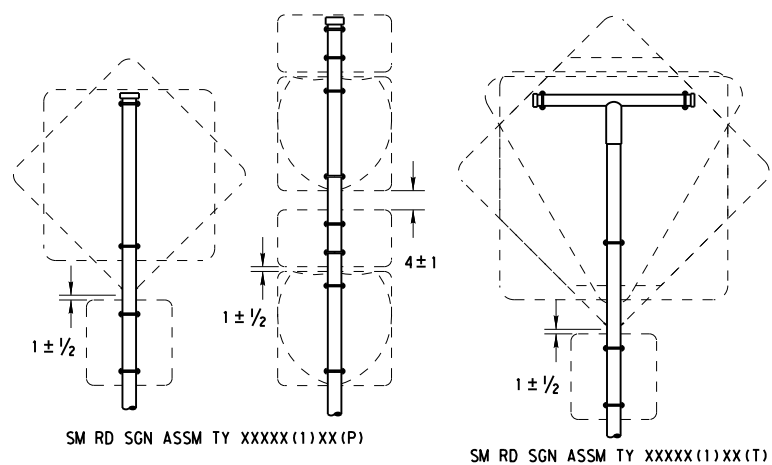


SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

© TxDOT July 2002		DN: TxDOT	CK: TxDOT	DW: TxDOT	CR: TxDOT	
9-08	REVISIONS		CONT	SECT	JOB	HIGHWAY
			0205	02	067	US 79
	DIST	COUNTY			SHEET NO.	
	BRY	ROBERTSON			67	

DATE: 8/25/2021 9:25:58 AM
 FILE: \\txdot.projectwiseonline.com\BRY\Design Projects\020502067\4 - Design\Plan Set\8 - Traffic\stds\stds2.dgn
 DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



All dimensions are in english unless detailed otherwise.

SM RD SGN ASSM TY XXXXX(1)XX(T) (* - See Note 12)

GENERAL NOTES:

- | SIGN SUPPORT | # OF POSTS | MAX. SIGN AREA |
|--------------|------------|----------------|
| 10 BWG | 1 | 16 SF |
| 10 BWG | 2 | 32 SF |
| Sch 80 | 1 | 32 SF |
| Sch 80 | 2 | 64 SF |
- The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
- Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
- Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
- Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
- For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
- When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
- Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
- Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
- Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
- Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
- Post open ends shall be fitted with Friction Caps.
- Sign blanks shall be the sizes and shapes shown on the plans.

		REQUIRED SUPPORT	
		SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)		TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)		TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)		TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
Warning	36x48, 48x36, and 48x48-inch signs		TY 10BWG(1)XX(T)
	48x60-inch signs		TY S80(1)XX(T)
	48x48-inch signs (diamond or square)		TY 10BWG(1)XX(T)
	48x60-inch signs		TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)		TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)		TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)		TY 10BWG(1)XX(T)

Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

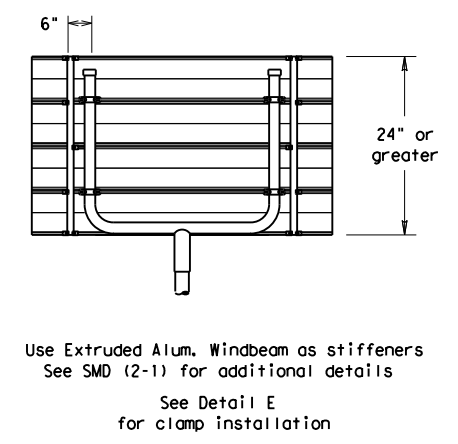
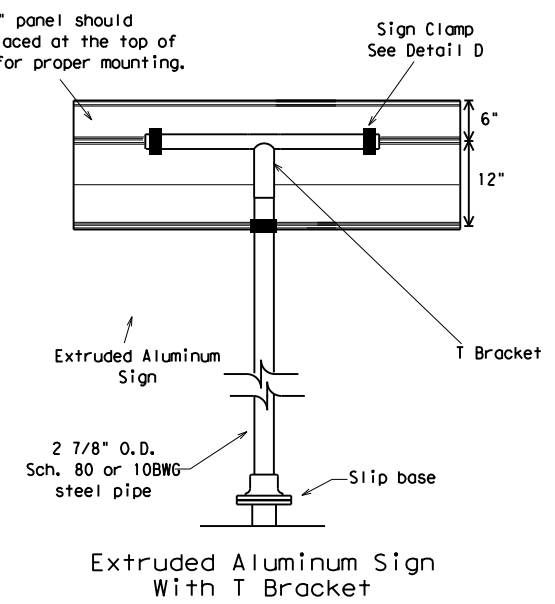
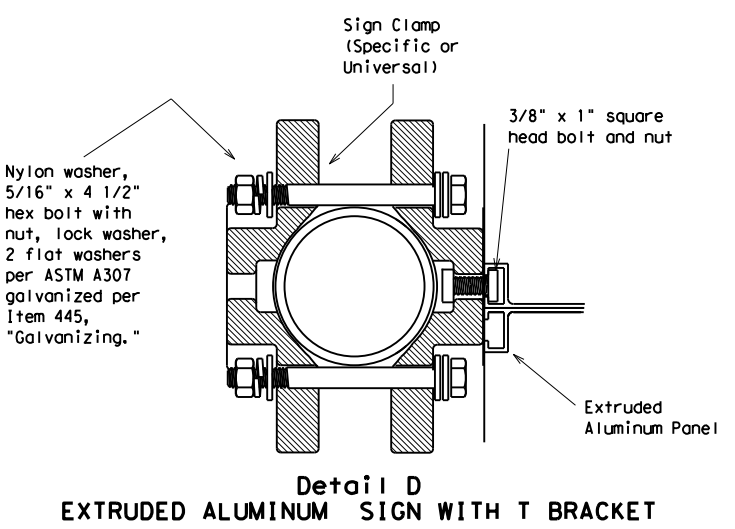
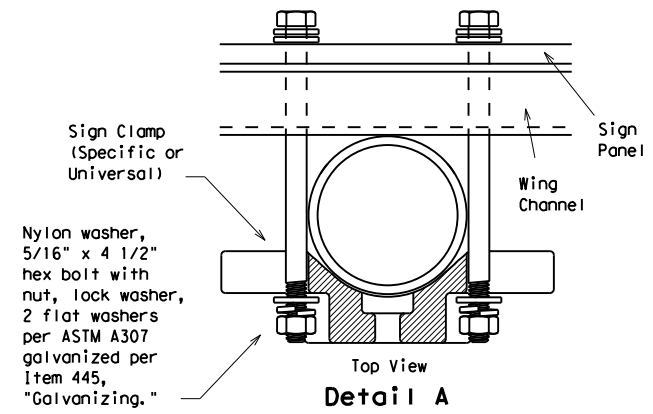
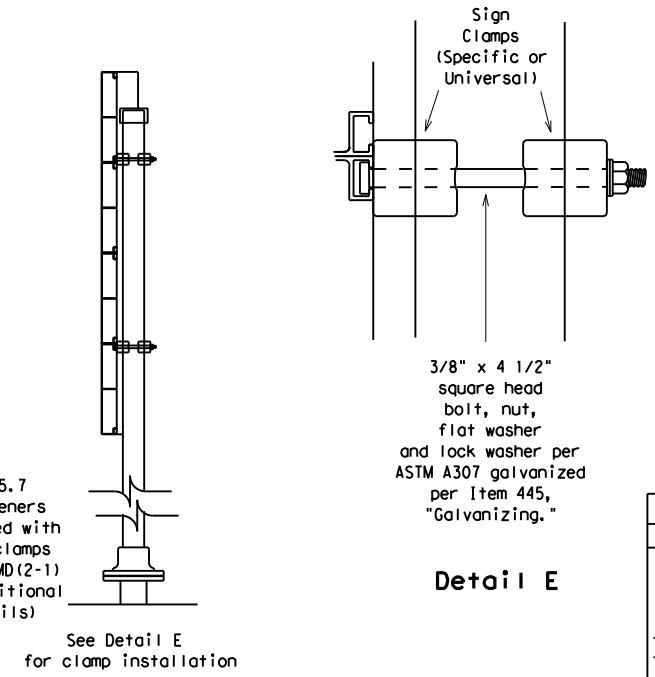
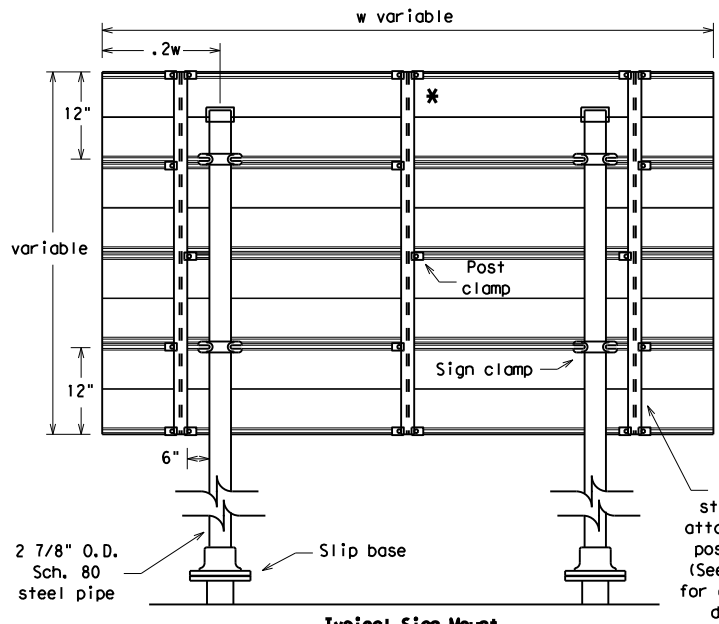
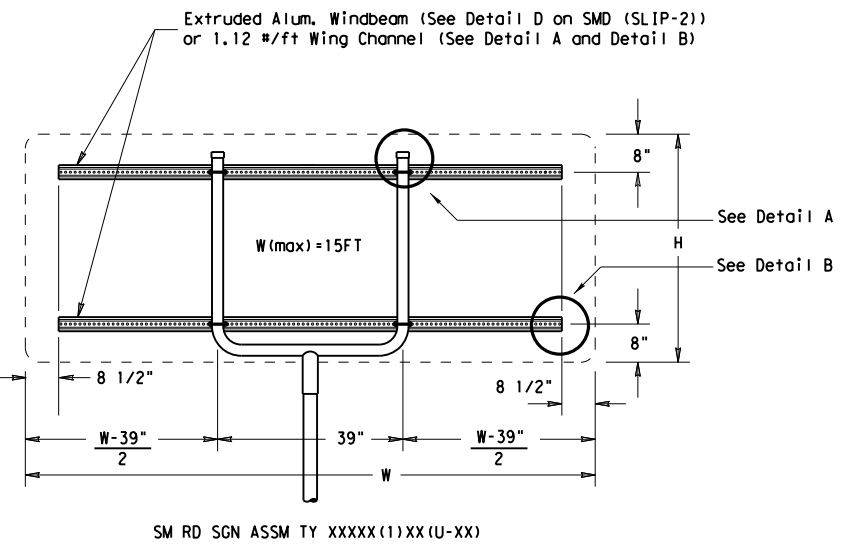
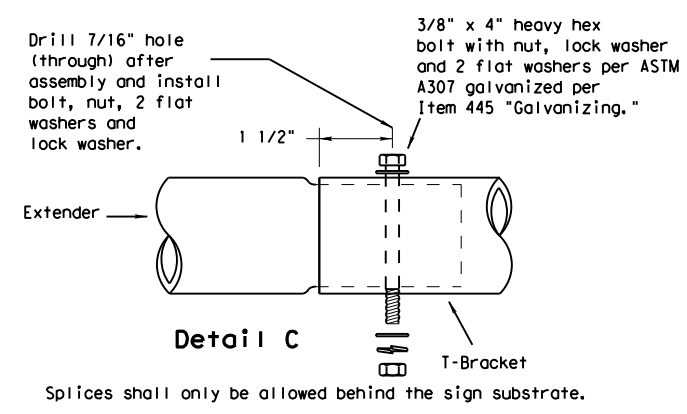
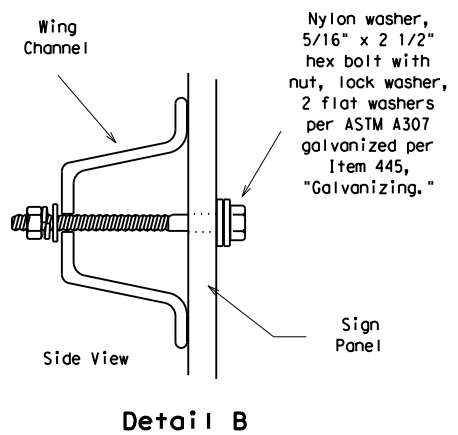
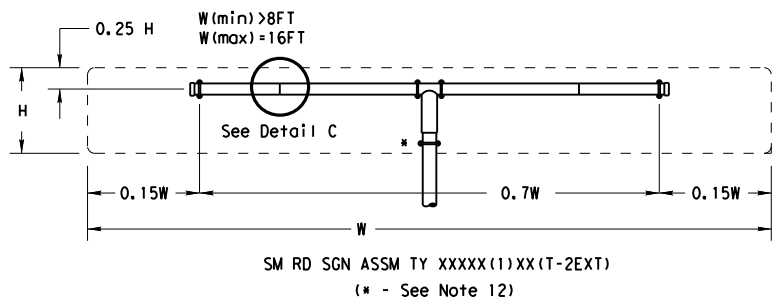


**SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM
SMD(SLIP-2)-08**

© TxDOT July 2002		DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
9-08	REVISIONS	CONT	SECT	JOB	HIGHWAY
		0205	02	067	US 79
		DIST	COUNTY		SHEET NO.
		BRY	ROBERTSON		68

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 8/25/2021 9:26:04 AM
 FILE: \\txdot.projectwiseonline.com:TXDOT14\Documents\17 - BRY\Design Projects\020502067\4 - Design\Plan Set\8. Traffic\8H. TrafficStandards\smds3.dgn



GENERAL NOTES:

- | SIGN SUPPORT | # OF POSTS | MAX. SIGN AREA |
|--------------|------------|----------------|
| 10 BWG | 1 | 16 SF |
| 10 BWG | 2 | 32 SF |
| Sch 80 | 1 | 32 SF |
| Sch 80 | 2 | 64 SF |
- The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
- Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
- Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
- Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
- For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
- When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
- Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
- Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
- Sign blanks shall be the sizes and shapes shown on the plans.
- Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
- Post open ends shall be fitted with Friction Caps.

REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
Warning	48x60-inch signs	TY S80(1)XX(T)
	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)



**SIGN MOUNTING DETAILS
 SMALL ROADSIDE SIGNS
 TRIANGULAR SLIPBASE SYSTEM
 SMD(SLIP-3)-08**

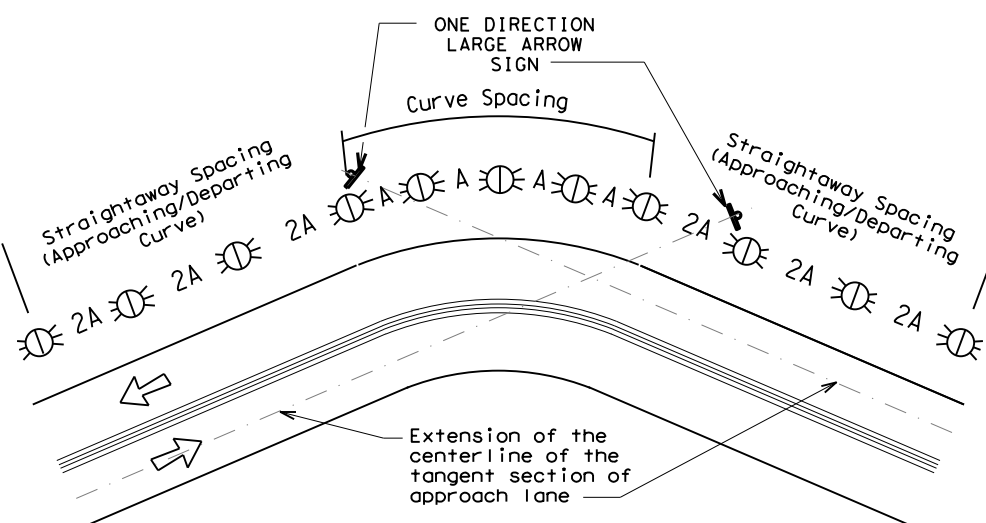
© TxDOT July 2002		DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
9-08	REVISIONS	CONT	SECT	JOB	HIGHWAY
		0205	02	067	US 79
		DIST	COUNTY		SHEET NO.
		BRY	ROBERTSON		69

DATE: 8/25/2021 9:26:18 AM
 FILE: \\txdot.projectwiseonline.com\TXDOT4\Documents\17 - BRY\Design Project\1708080808\1708080808.dgn
 The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of units or the accuracy of the information contained herein.

MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

Amount by which Advisory Speed is less than Posted Speed	Curve Advisory Speed	
	Turn (30 MPH or less)	Curve (35 MPH or more)
5 MPH & 10 MPH	• RPMs	• RPMs
15 MPH & 20 MPH	• RPMs and One Direction Large Arrow sign	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons.
25 MPH & more	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons	• RPMs and Chevrons

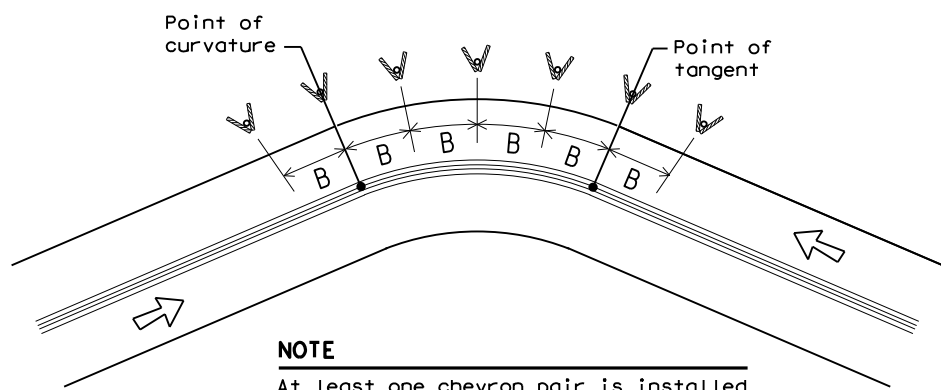
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



NOTE

ONE DIRECTION LARGE ARROW (W1-6) sign should be located at approximately and perpendicular to the extension of the centerline of the tangent section of approach lane.

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



NOTE

At least one chevron pair is installed beyond the point of tangent in tangent section.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN				
Degree of Curve	FEET			
	Radius of Curve	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
		A	2A	B
1	5730	225	450	—
2	2865	160	320	—
3	1910	130	260	200
4	1433	110	220	160
5	1146	100	200	160
6	955	90	180	160
7	819	85	170	160
8	716	75	150	160
9	637	75	150	120
10	573	70	140	120
11	521	65	130	120
12	478	60	120	120
13	441	60	120	120
14	409	55	110	80
15	382	55	110	80
16	358	55	110	80
19	302	50	100	80
23	249	40	80	80
29	198	35	70	40
38	151	30	60	40
57	101	20	40	40

Curve delineator approach and departure spacing should include 3 delineators spaced at 2A. This spacing should be used during design preparation or when the degree of curve is known.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN			
Advisory Speed (MPH)	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
	A	2xA	B
65	130	260	200
60	110	220	160
55	100	200	160
50	85	170	160
45	75	150	120
40	70	140	120
35	60	120	120
30	55	110	80
25	50	100	80
20	40	80	80
15	35	70	40

If the degree of curve is not known, delineator spacing may be determined based on the Advisory Speed of the curve. Use the delineator curve spacing for each Advisory Speed (MPH).

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

CONDITION	REQUIRED TREATMENT	MINIMUM SPACING
Frwy./Exp. Tangent	RPMs	See PM-series and FPM-series standard sheets
Frwy./Exp. Curve	Single delineators on right side	See delineator spacing table
Frwy/Exp. Ramp	Single delineators on at least one side of ramp (should be on outside of curves) (see Detail 3 on D&OM(4))	100 feet on ramp tangents Use delineator spacing table for ramp curves ("straightway spacing" does not apply to ramp curves)
Acceleration/Deceleration Lane	Double delineators (see Detail 3 on D&OM(4))	100 feet (See Detail 3 on D & OM (4))
Truck Escape Ramp	Single red delineators on both sides	50 feet
Bridge Rail (steel or concrete) and Metal Beam Guard Fence	Bi-Directional Delineators when undivided with one lane each direction Single Delineators when multiple lanes each direction	Equal spacing (100' max) but not less than 3 delineators
Concrete Traffic Barrier (CTB) or Steel Traffic Barrier	Barrier reflectors matching the color of the edge line	Equal spacing 100' max
Cable Barrier	Reflectors matching the color of the edge line	Every 5th cable barrier post (up to 100' max)
Guard Rail Terminus/Impact Head	Divided highway - Object marker on approach end Undivided 2-lane highways - Object marker on approach and departure end	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5) and D & OM (6)
Bridges with no Approach Rail	Type 3 Object Marker (OM-3) at end of rail and 3 single delineators approaching rail	See D & OM(5)
Reduced Width Approaches to Bridge Rail	Type 2 and Type 3 Object Markers (OM-3) and 3 single delineators approaching bridge	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5)
Culverts without MBGF	Type 2 Object Markers	See Detail 2 on D & OM(4)
Crossovers	Double yellow delineators and RPMs	See Detail 1 on D & OM (4)
Pavement Narrowing (lane merge) on Freeways/Expressway	Single delineators adjacent to affected lane for full length of transition	100 feet

NOTES

- Unless indicated otherwise, the delineator or barrier reflector color shall conform to the color of the pavement edge line on the side of the road where the delineators or barrier reflectors are placed.
- Barrier reflectors may be used to replace required delineators.
- Single red delineators may be mounted on the back side of delineator posts for wrong way driver applications

LEGEND	
	Bi-directional Delineator
	Delineator
	Sign

Traffic Safety Division Standard

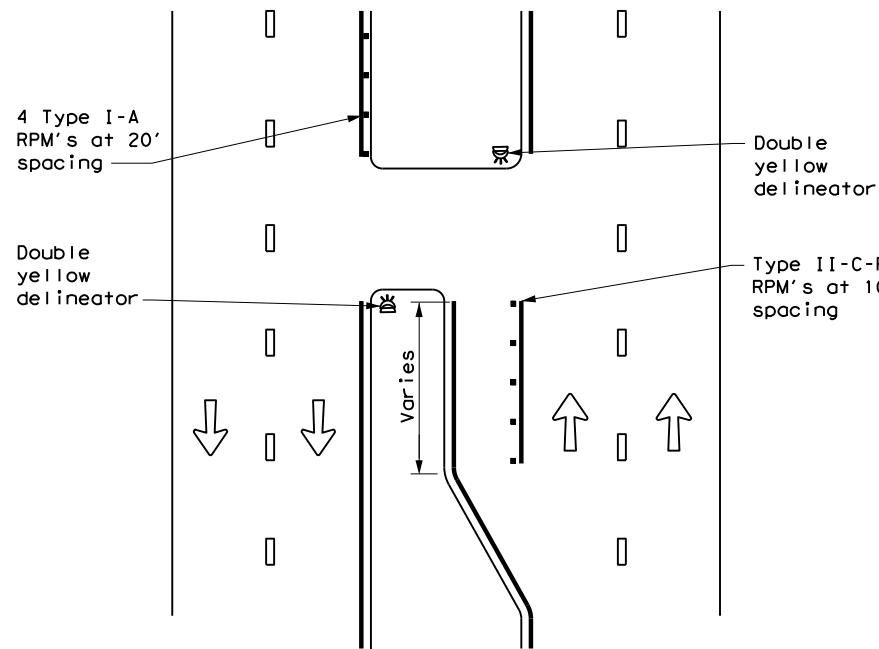
DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(3)-20

FILE: dom3-20.dgn	DW: TXDOT	CK: TXDOT	OW: TXDOT	CR: TXDOT
© TXDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS		0205 02	067	US 79
3-15 8-15	DIST	COUNTY	SHEET NO.	
8-15 7-20	BRY	ROBERTSON	72	

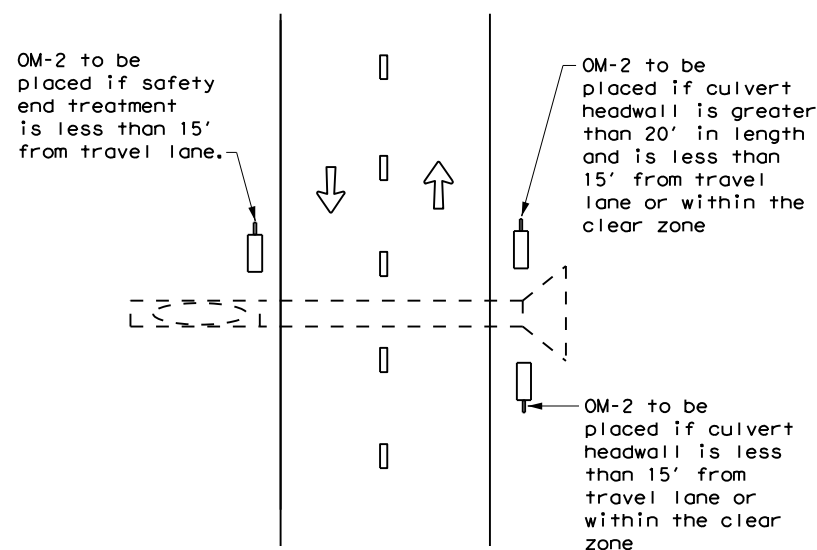
DATE: 8/25/2021 9:26:24 AM
 FILE: \\txdot.projectwiseonline.com:TXDOT14\Documents\17 - BRY\Design Projects\020502\020502.dgn
 DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of any information into a digital format for use in a computer system. TxDOT assumes no responsibility for the use of any information in a digital format for use in a computer system.

CROSSOVERS



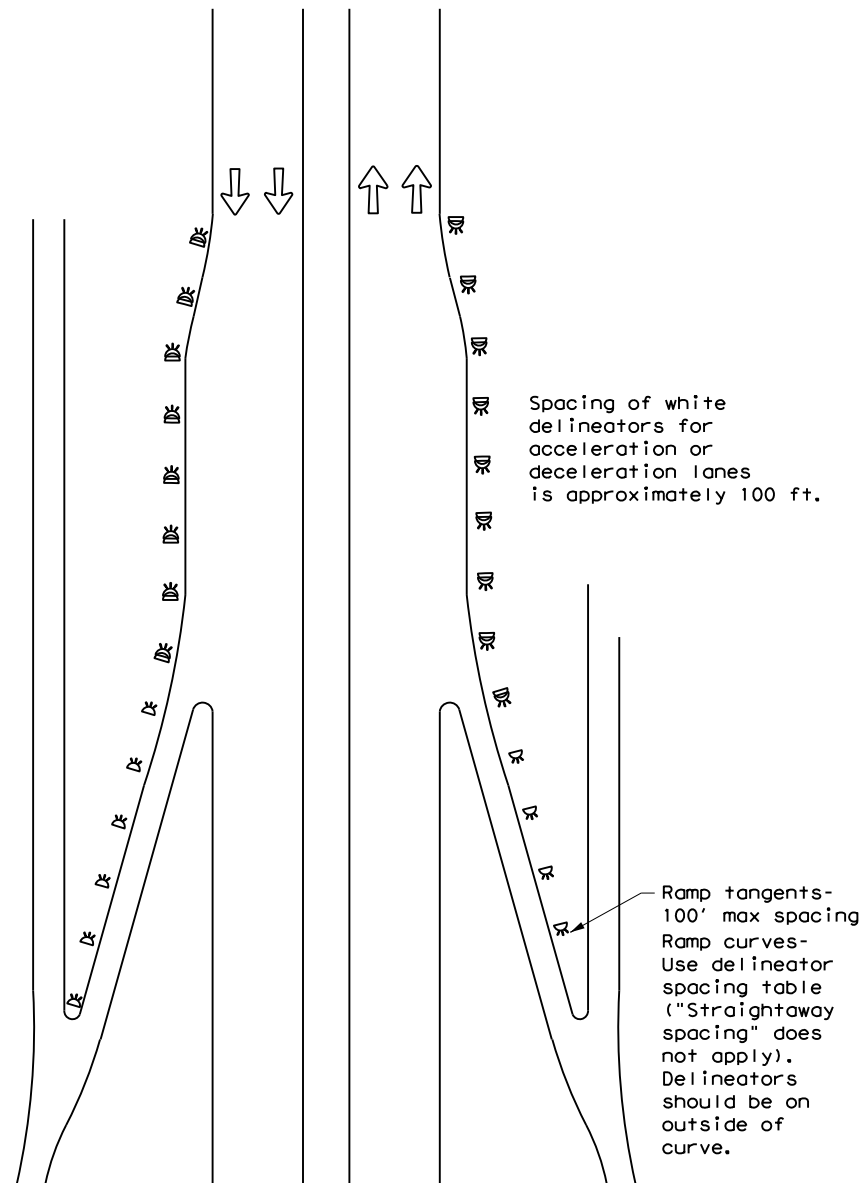
DETAIL 1

FOR CULVERTS WITHOUT MBGF



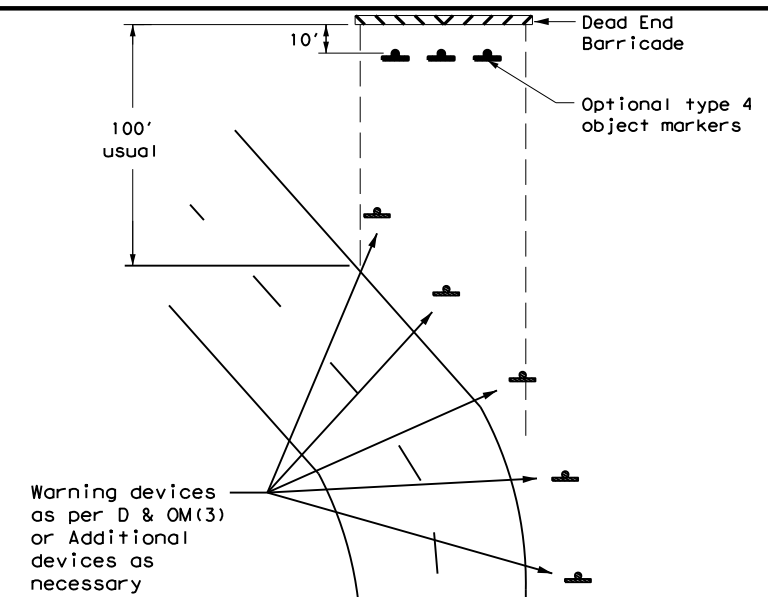
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



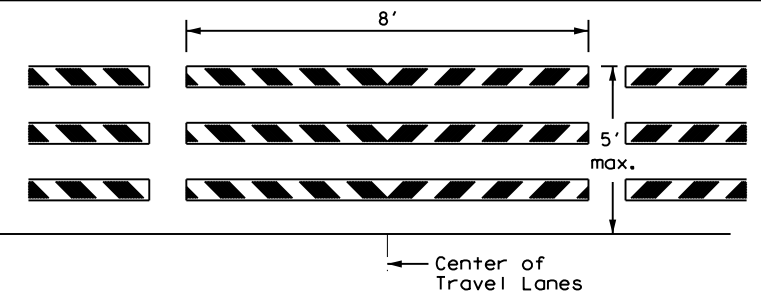
DETAIL 3

TYPICAL APPLICATION OF DEAD END BARRICADE



DETAIL 4

TYPICAL DEAD END BARRICADE INSTALLATION



NOTES

- Barricade striping shall be red and white reflective sheeting for all permanent road closures.
- Barricade striping is red and white sloping toward the center of the roadway.
- Type 3 Barricade Supports should be anchored to soil or pavement as described in compliant Work Zone Traffic Control Devices List, section D.2.f and D.2.g.

DETAIL 5

LEGEND	
	Bidirectional Delineator
	Delineator
	OM-3
	Barricade
	Sign
	OM-2
	Double Delineator



DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(4) -20

FILE: dom4-20.dgn	DW: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TXDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0205	02	067	US 79
3-15	DIST	COUNTY	SHEET NO.	
7-20	BRY	ROBERTSON	73	

SITE DESCRIPTION

PROJECT LIMITS:

CSJ 0205-02-067 - From: Latitude XX^XX'-XX", Longitude XX^XX'-XX"
 To: Latitude XX^XX'-XX", Longitude XX^XX'-XX"

PROJECT DESCRIPTION:

For the construction of left turn lane.

SEQUENCE OF MAJOR SOIL DISTURBING ACTIVITIES:

Extension of culvert at station 128+00. Widen roadway approximately 14' along the length of the project and shape the side slope and ditch.

TOTAL PROJECT AREA: 7.8 AC

TOTAL AREA TO BE DISTURBED: 2.1 AC - 28%

EXISTING CONDITION OF SOIL & VEGETATIVE COVER AND % OF EXISTING VEGETATIVE COVER:

The easy way to get this is to talk to your Environmental folks and get this information.

NAME OF RECEIVING WATERS:

From STA 101+50 to STA 135+60 cross drainage structures collect into Mineral Creek which flows approximately 7 miles into Duck Creek which flows approximately 5 miles into the Navasota River (Brasoz River Basin Segment 1209H).

ANTICIPATED EFFECT OF STORM WATER ON THREATENED AND ENDANGERED SPECIES AND WILDLIFE HABITAT:

See Environmental Permits, Issues and Commitments (EPIC) sheet.

EROSION AND SEDIMENT CONTROLS AND TCEQ 401 CERTIFICATION

I. SOIL STABILIZATION PRACTICES AND EROSION CONTROL:

- TEMPORARY SEEDING
- PERMANENT PLANTING, SODDING, OR SEEDING
- MULCHING
- SOIL RETENTION BLANKET
- BUFFER ZONES
- PRESERVATION OF NATURAL RESOURCES
- SUBSURFACE DRAINS

OTHER:

II. STRUCTURAL PRACTICES AND SEDIMENTATION CONTROL: (T/P) *

- SEDIMENT CONTROL FENCES
- HAY BALES
- ROCK BERMS
- STORM SEWERS
- CURBS AND GUTTERS
- VELOCITY CONTROL DEVICES
- PIPE SLOPE DRAINS
- PAVED FLUMES
- SAND BAG BERM
- GRAVEL BAG BERM
- BRUSH BERMS
- TRIANGULAR FILTER DIKE
- STONE OUTLET SEDIMENT TRAPS
- ROCK BEDDING AT CONSTRUCTION EXIT
- TIMBER MATTING AT CONSTRUCTION EXIT
- DIVERSION, INTERCEPTOR, OR PERIMETER DIKES
- DIVERSION, INTERCEPTOR, OR PERIMETER SWALES
- DIVERSION DIKE AND SWALE COMBINATIONS
- ROCK FILTER DAMS
- CHANNEL LINERS
- SEDIMENT TRAPS
- SEDIMENT BASINS
- STORM INLET SEDIMENT TRAP
- STONE OUTLET STRUCTURES

* T means Temporary - P means Permanent

OTHER:

III. POST CONSTRUCTION: (IF COE PERMIT IS ISSUED)

- RETENTION/IRRIGATION
- EXTENDED DETENTION BASINS
- VEGETATION FILTER STRIPS
- CONSTRUCTION WETLANDS
- WET BASINS
- VEGETATION LINED DRAINAGE DITCHES
- GRASSY SWALES
- SAND FILTER SYSTEMS

OTHER:

NARRATIVE - SEQUENCE OF CONSTRUCTION (STORM WATER MANAGEMENT) ACTIVITIES:

All work to be performed by the Contractor.
 The order of activities will be as follows: Place silt fence and rock filter dam as shown on sheets 75-76. Perform culvert work as shown on sheet 43. Place rock filter dam at the completed culvert. Complete roadway widening work. Seed, fertilize, and water disturbed areas and remove temporary control measures when work is completed.

STORM WATER MANAGEMENT:

OTHER EROSION AND SEDIMENT CONTROLS:

MAINTENANCE:

All erosion and sediment controls will be maintained in good working order. If a repair is necessary, it will be done at the earliest date possible, but no later than 7 calendar days after the surrounding exposed ground has dried sufficiently to prevent further damage from heavy equipment. The areas adjacent to creeks and drainageways shall have priority. Sediment must be removed from sediment traps or sedimentation ponds when design capacity has been reduced by 50%.

INSPECTION:

A TxDOT inspector will perform an inspection every 7 days.

DESCRIPTION OF CONSTRUCTION MATERIALS TO BE STORED ON-SITE AND CONTROLS TO PREVENT THESE FROM ENTERING STORM WATER:

Store all construction materials (wood, flex base, aggregate, etc.) in locations where they will not enter storm water runoff. Structural controls may be required for flex base, aggregate and earth stockpiles.

WASTE MATERIALS:

A TxDOT inspector will perform an inspection every 7 days.

HAZARDOUS WASTE (INCLUDING SPILL REPORTING):

At a minimum, any products in the following categories are considered to be hazardous: paints, acids for cleaning masonry surfaces, cleaning solvents, asphalt products, chemical additives for soil stabilization or concrete curing compounds and additives. In the event of a spill which may be hazardous, the Engineer should be contacted immediately.

SANITARY WASTE:

All sanitary waste will be collected from the portable units as necessary or as required by local regulation by a licensed sanitary waste management director.

OFFSITE VEHICLE TRACKING:

- HAUL ROADS DAMPENED FOR DUST CONTROL
- LOADED HAUL TRUCKS TO BE COVERED WITH TARPULIN
- EXCESS DIRT ON ROAD REMOVED DAILY
- STABILIZED CONSTRUCTION ENTRANCE

REMARKS:


REV DATE: 2-12-2015 CSJ: XXXX-XX-XXX FILENAME: p:\t\trdot\project\wissonline.com\T\DOT4\Documents\17 - BRY\Design Projects\02050206714 - Design\Plan Set\10 - Environmental\10A - SW3P\SW3PPlanr.dgn

PRINT DATE	REVISION DATE
8/25/2021	1/11/2007



Timothy Tyler Thomason

8/25/2021




Texas Department of Transportation ©SYRS
 Bryan District

TxDOT STORM WATER POLLUTION PREVENTION PLAN (SW3P)

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER
6	F 2022(117)	US 79
STATE	DISTRICT	COUNTY
TEXAS	BRY	ROBERTSON
CONTROL	SECTION	JOB SHEET NO.
0205	02	067 74

REV DATE: 2-12-2015
 CSJ: XXXX-XX-XXX
 FILENAME: p:\x\dot\project\visonline.com\T\DOT4\Documents\17 - BRY\Design Projects\02050206714 - Design\Plan Set\110 - Environmental\10A - SW3P\SW3PLayout

LEGEND

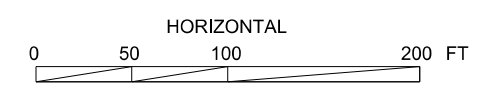
-  SEDIMENT CONTROL FENCE (1)
-  ROCK FILTER DAM (TY 2) (1)

GENERAL NOTES:
 SEDIMENT CONTROL FENCE ESTIMATED AT 20' EACH, UNLESS OTHERWISE NOTED.
 TY 1 AND TY 2 ROCK FILTER DAM ESTIMATED AT 20' EACH, UNLESS OTHERWISE NOTED.

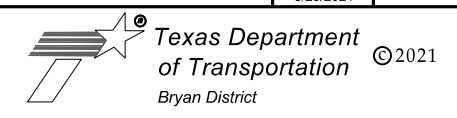


Timothy Tyler Thomason

8/25/2021



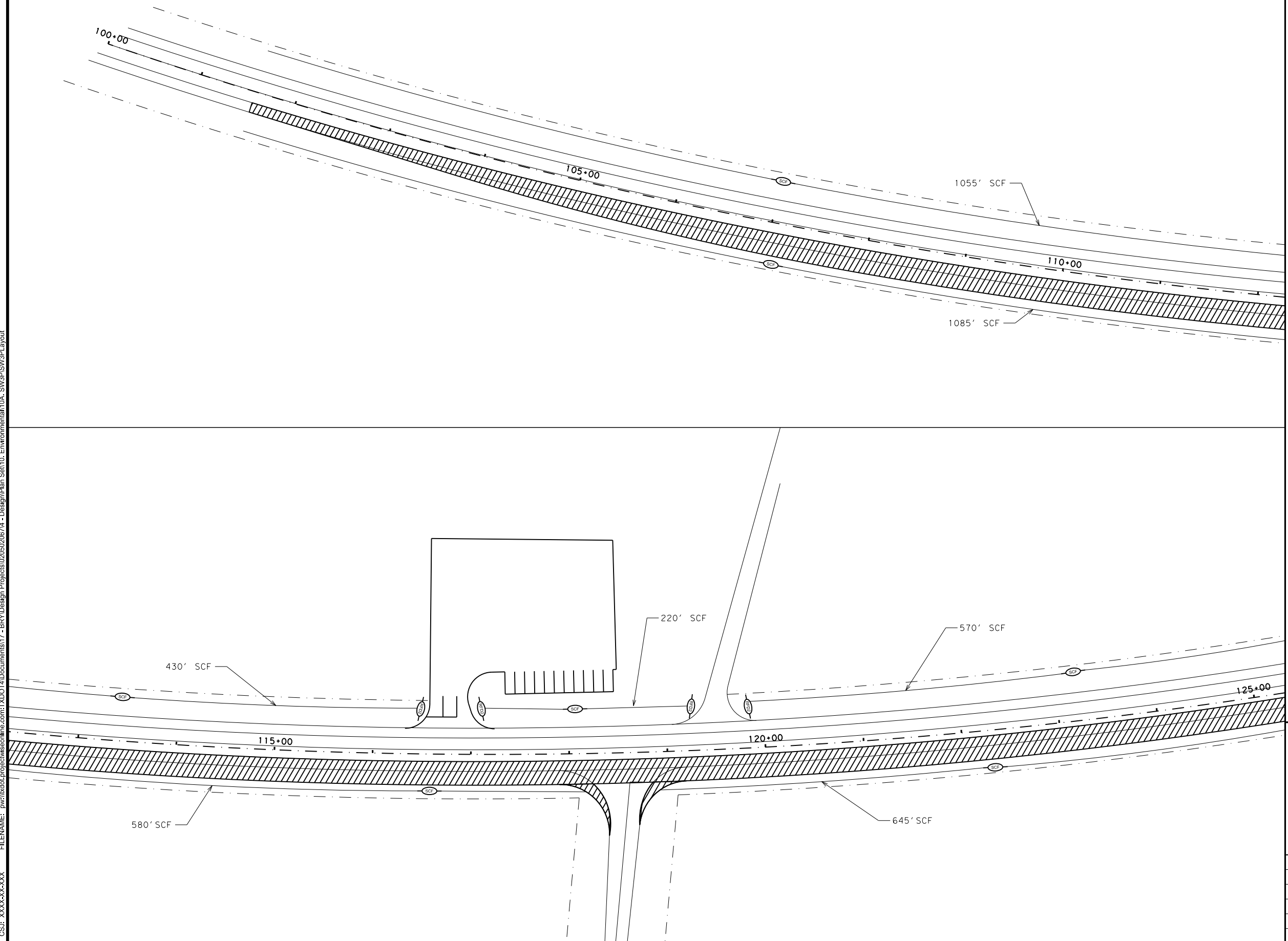
PRINT DATE	REVISION DATE
8/25/2021	



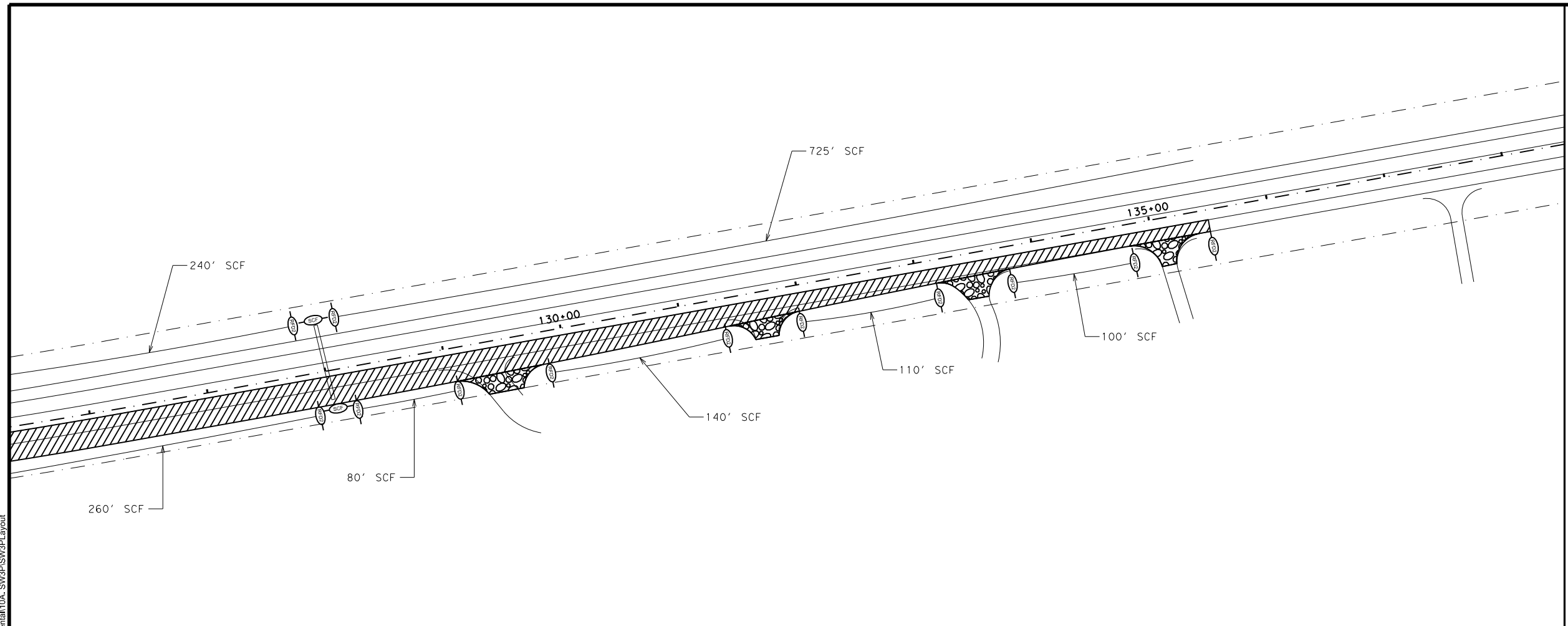
SW3P LAYOUT

SHEET 1 OF 2 SHEETS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER	
6	F 2022(117)	US 79	
STATE	DISTRICT	COUNTY	
TEXAS	BRYAN	ROBERTSON	
CONTROL	SECTION	JOB	SHEET NO.
0205	02	067	75



REV DATE: 2-12-2015
 CSJ: XXXX-XX-XXX
 FILENAME: p:\t\dot\project\wiseonline.com\T\DOT4\Documents\17 - BRY\Design Projects\02050206714 - Design\Plan Set\110 - Environmental\10A - SW3P\SW3PLayout



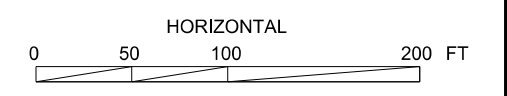
LEGEND	
	SEDIMENT CONTROL FENCE (I)
	ROCK FILTER DAM (TY 2) (I)

GENERAL NOTES:
 SEDIMENT CONTROL FENCE ESTIMATED AT 20' EACH, UNLESS OTHERWISE NOTED.
 TY 1 AND TY 2 ROCK FILTER DAM ESTIMATED AT 20' EACH, UNLESS OTHERWISE NOTED.

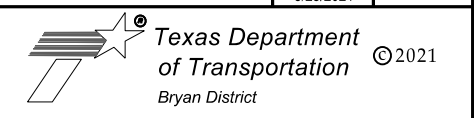


Timothy Tyler Thomason

8/25/2021



PRINT DATE	REVISION DATE
8/25/2021	



**SW3P
 LAYOUT**

SHEET 2 OF 2 SHEETS

FED. RD. DIV. NO.	PROJECT NUMBER	HIGHWAY NUMBER	
6	F 2022(117)	US 79	
STATE	DISTRICT	COUNTY	
TEXAS	BRYAN	ROBERTSON	
CONTROL	SECTION	JOB	SHEET NO.
0205	02	067	76

REV DATE: 2-12-2015
 CS: XXX-XX-XX
 FILENAME: p:\t\tdot\projectwiseonline.com\TXDOT\4\Documents\17 - BRY\Design Projects\0205020674 - Design\Plan Set\10 - Environmental\10B - EPIC\US 79 EPIC.DGN

During the planning phase of project development the following environmental permits, issues and commitments have been developed during coordination with resource agencies, local governmental entities and the general public. Any change orders and/or deviations from the final design must be reported to the Engineer prior to the commencement of construction activities. As additional environmental clearances may be required.

I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

TPDES TXR 150000: Stormwater Discharge Permit or Construction General Permit required for projects with 1 or more acres disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

Required Action No Action Required

Action No.

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000
2. Comply with the SW3P and revise when necessary to control pollution or required by the Engineer.
3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.

Refer to 2014 TxDOT Standard Specification Items:

- 7.7.2 Texas Pollutant Discharge Elimination System (TPDES) Permits and Storm Water Pollution Prevention Plans (SWP3)
- 506 Temporary Erosion, Sedimentation and Environmental Controls
- 734 Litter Removal
- 735 Debris Removal
- 738 Cleaning and Sweeping Highways

II. WORK IN OR NEAR STREAMS, WATER BODIES AND WETLANDS CLEAN WATER ACT SECTIONS 401 AND 404

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas. The Contractor must adhere to all of the terms and conditions associated with the following permit(s):

No Permit Required

- Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)
- Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)
- Individual 404 Permit Required
- Other Nationwide Permit Required: NWP#

Required Actions: List locations of waters of the US.

1. STA 80+61, 122+09, 167+75, 183+90, 260+24, 315+61, 392+92, 405+31, 411+60, 416+90, 456+30, 535+87

Information regarding the USACE Nationwide Permit Program can be found at: <http://www.swf.usace.army.mil/Missions/Regulatory/Permitting/GeneralPermits.aspx>

- Refer to 2014 TxDOT Standard Specification Items:
- 7.7.3 Work in Waters of the United States
 - 7.7.6 Project Specific Locations
 - 496 Removing Structures
 - 506 Temporary Erosion, Sedimentation and Environmental Controls
 - 506.4.3.4 Restricted Activities and Required Precautions

III. CULTURAL RESOURCES

Refer to 2014 TxDOT Standard Specification Item 7.7.1 Cultural Resources, in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) immediately cease work in the vicinity and contact the Engineer.

Required Action No Action Required

IV. VEGETATION RESOURCES

Preserve native vegetation to the extent practical.

Required Action No Action Required

Action No.

Refer to 2014 TxDOT Standard Specification Items:

- 160 Topsoil
- 161 Compost
- 162 Sodding for Erosion Control
- 164 Seeding for Erosion Control
- 166 Fertilizer
- 168 Vegetative Watering
- 169 Soil Retention Blankets
- 170 Irrigation System
- 180 Wildflower Seeding
- 192 Landscape Planting
- 193 Landscape Establishment
- 506 Temporary Erosion, Sedimentation, and Environmental Controls
- 730 Roadside Mowing
- 751 Landscape Maintenance
- 752 Tree and Brush Removal

V. FEDERAL LISTED, PROPOSED THREATENED, ENDANGERED SPECIES, CRITICAL HABITAT, STATE LISTED SPECIES, CANDIDATE SPECIES AND MIGRATORY BIRDS.

Required Action No Action Required

Action No.

1. Do not kill snakes or other animals!
2. Do not destroy nests on structures within the project limits.

Temporarily prevent the building of nests on any structures that require work within the project limits during the construction timeframe.

This can be accomplished by application of bird repellent gel, netting, or removal by hand every 3-4 days.

The nesting/breeding season for migratory birds is March 1 - September 1.

Under the Migratory Bird Treaty Act (MBTA), it is unlawful by any means or manner, to pursue, hunt, take, capture, [or] kill any migratory birds except as permitted by regulation (16 U.S.C. 703-704). Neither the statute nor its implementing regulations (Title 50, Code of Federal Regulations, Parts 10, 13, 21) exempt unintentional take of migratory birds. The unauthorized take (e.g. killing, capturing, or collecting) of migratory birds is a strict liability criminal offense that does not require knowledge or specific intent on the part of the offender. Even when engaged in an otherwise lawful activity for which the intent is not the killing of migratory birds, a violation may be committed.

3. Apply hydramulching/seeding for soil stabilization where feasible; or utilize erosion control blankets that contain no netting or contain loosely woven, natural fiber.

4. For open trenches and excavated pits, install escape ramps at an angle of less than 45 degrees on areas left uncovered. Visually inspect excavation areas for trapped wildlife prior to backfilling.

The Bryan District Environmental Section can be contacted at (979) 778-9766 to assist with the removal of wildlife that will not leave on their own with gentle persuasion.

Refer to 2014 TxDOT Standard Specification Items:
 7.7.6 Project Specific Locations

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

Comply with the Hazard Communication Act (the Act) for personnel who will be working with hazardous materials by conducting safety meetings prior to beginning construction and making workers aware of potential hazards in the workplace. Ensure that all workers are provided with personal protective equipment appropriate for any hazardous materials used. Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act. Maintain an adequate supply of on-site spill response materials, as indicated in the MSDS. In the event of a spill, take actions to mitigate the spill as indicated in the MSDS, in accordance with safe work practices, and contact the Engineer immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills.

Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include, but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the Act.

Does the project involve any bridge class structure rehabilitation or replacements (bridge class structures not including box culverts)?

Yes No

If "No", then no further action is required.

If "Yes", then TxDOT is responsible for completing asbestos assessment/inspection.

Are the results of the asbestos inspection positive (is asbestos present)?

Yes No

If "Yes", then TxDOT must retain a DSHS licensed asbestos consultant to assist with the notification, develop abatement/mitigation procedures, and perform management activities as necessary. The notification form to DSHS must be postmarked at least 15 working days prior to scheduled demolition.

If "No", then TxDOT is still required to notify DSHS 15 working days prior to any scheduled demolition.

In either case, the Contractor is responsible for providing the date(s) for abatement activities and/or demolition with careful coordination between the Engineer and asbestos consultant in order to minimize construction delays and subsequent claims.

Any other evidence indicating possible hazardous materials or contamination discoverd on site. Hazardous Materials or Contamination Issues Specific to this Project:

Required Action No Action Required

Action No.

1. The Clean Water Act, in part, requires that any spill of oil that could enter a waterway, as defined by the Act, and that violates applicable water quality standards or causes a film or sheen on water require reporting to the TCEQ and local authorities. Contact the Bryan District Environmental Section at 979-778-9766.

If potentially hazardous material and/or contaminated media (i.e. soil, groundwater, surface water, sediment, building materials) are unexpectedly encountered during construction, immediately cease work in the vicinity and contact the Engineer.

- Refer to 2014 TxDOT Standard Specification Items:
- 6.10 Hazardous Materials
 - 7.12 Responsibility for Hazardous Materials

VII. OTHER ENVIRONMENTAL ISSUES

Required Action No Action Required

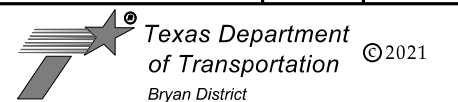
Action No.

1. Refer to 2014 TxDOT Standard Specification Items:
 7.7.6 Project Specific Locations
 751 Landscape Maintenance

Contacts:

Mr. John D. Moravec
 Environmental Coordinator
 Texas Department of Transportation
 Bryan District
 2591 N. Earl Rudder Freeway
 Bryan, TX 77803
 Phone: (979) 778-9766
 Fax: (979) 778-9702
 e-mail: John.Moravec@txdot.gov

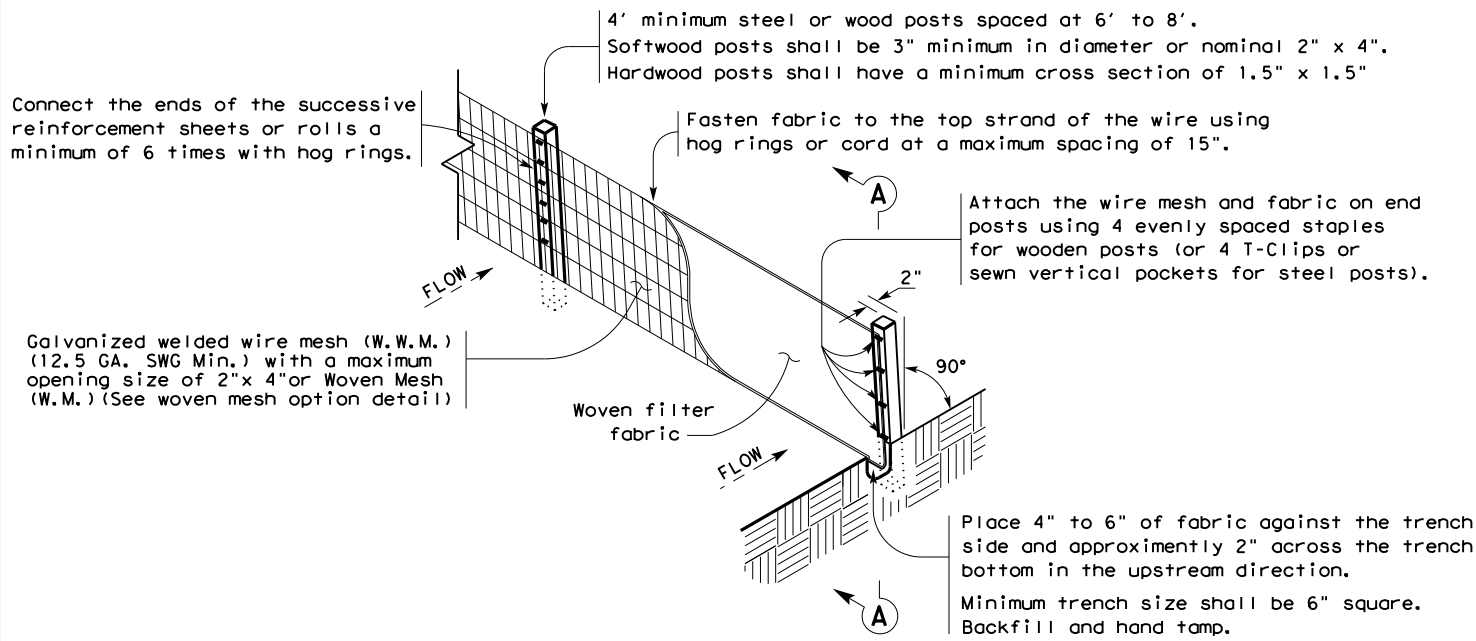
PRINT DATE	REVISION DATE
8/25/2021	02/12/2015



ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS (EPIC)

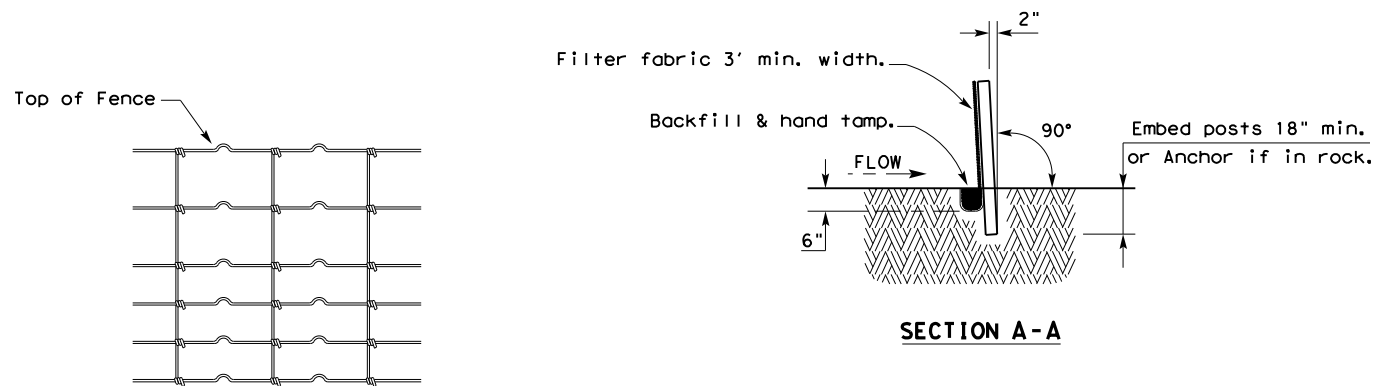
FED. RD. DIST. NO.	PROJECT NUMBER	HIGHWAY NUMBER	
6	F 2022(117)	US 79	
STATE	DISTRICT	COUNTY	
TEXAS	BRYAN	ROBERTSON	
CONTROL	SECTION	JOB	SHEET NO.
0205	02	067	77

80252021
 p:\fns\txdot\projectwiseonline.com\TXDOT4\Documents\17 - BR\Design Projects\020502067\4 - Design\Plan Set\10 - Environmental\Standards\ec116.dgn
 DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



TEMPORARY SEDIMENT CONTROL FENCE

SCF



HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

Galvanized hinge joint knot woven mesh (12.5 GA. SWG Min.) requires a minimum of five horizontal wires spaced at a maximum of 12 inches apart and all vertical wires spaced at a maximum of 12 inches apart.

SEDIMENT CONTROL FENCE USAGE GUIDELINES

A sediment control fence may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A 2 year storm frequency may be used to calculate the flow rate to be filtered.

Sediment control fence should be sized to filter a maximum flow through rate of 100 GPM/FT². Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

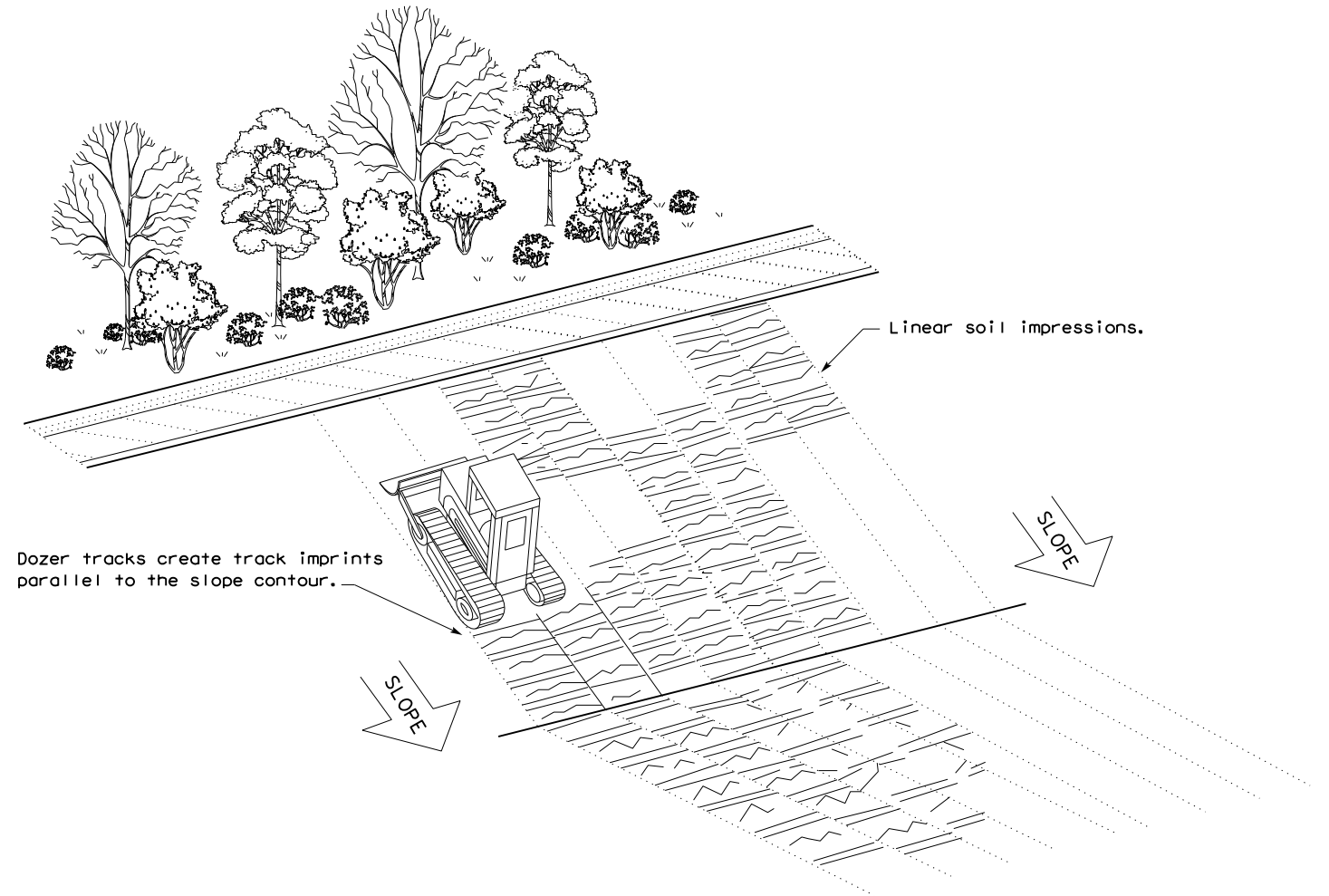
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

1. Vertical tracking is required on projects where soil distributing activities have occurred unless otherwise approved.
2. Perform vertical tracking on slopes to temporarily stabilize soil.
3. Provide equipment with a track undercarriage capable of producing linear soil impressions measuring a minimum of 12" in length by 2" to 4" in width by 1/2" to 2" in depth.
4. Do not exceed 12" between track impressions.
5. Install continuous linear track impressions where the minimum 12" length impressions are perpendicular to the slope or direction of water flow.

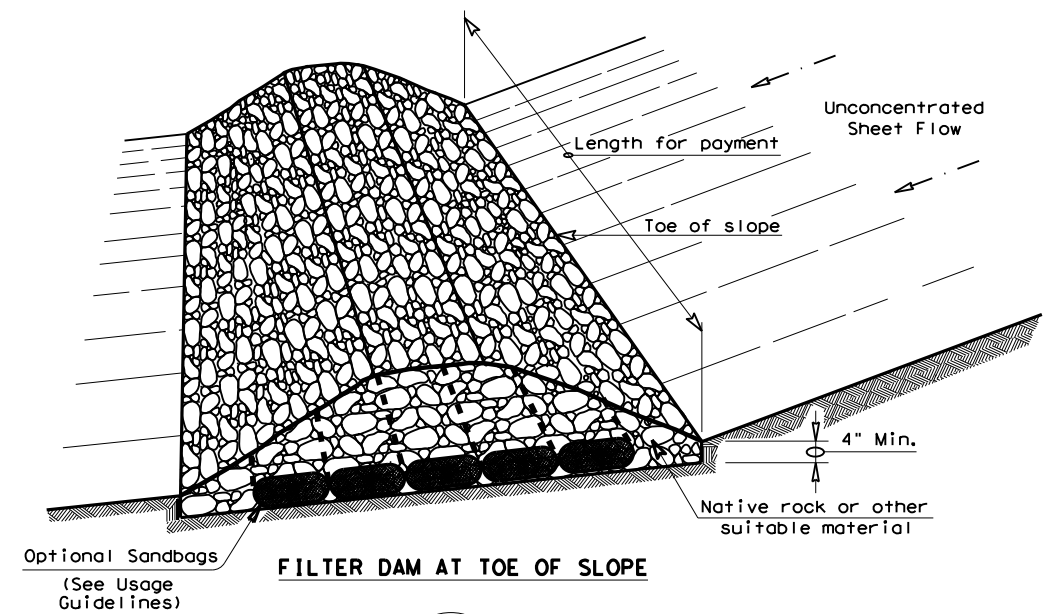


VERTICAL TRACKING

				Design Division Standard	
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES FENCE & VERTICAL TRACKING EC(1) - 16					
FILE: ec116	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS	
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY	
REVISIONS	0205	02	067	US 79	
	DIST	COUNTY	SHEET NO.		
	BRY	ROBERTSON	78		

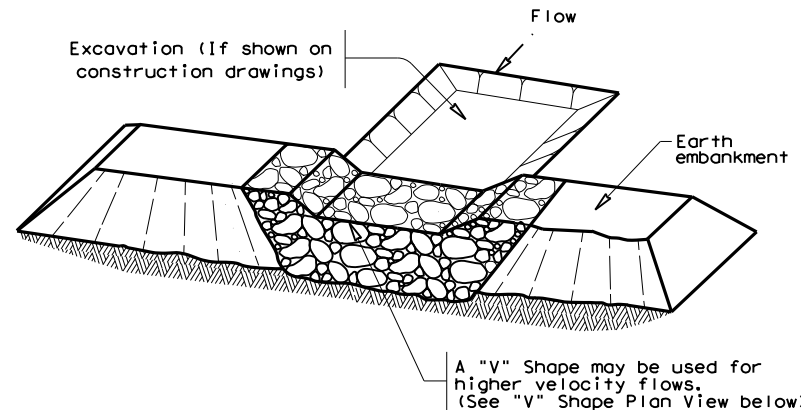
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 8/25/2021
 FILE: \\ttdot\projectwise\line.com\TXDOT4\Documents\17 - BRY\Design Projects\020502067\4 - Design\Plan Set\10. EnvironmentalStandards\ec216.dgn



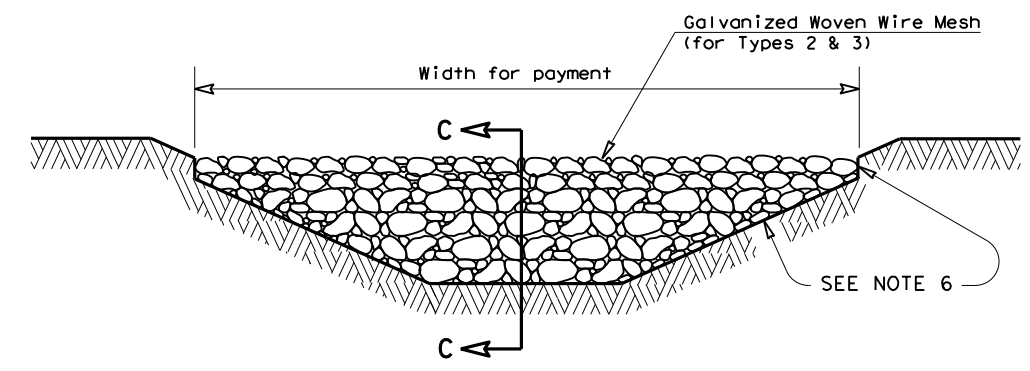
FILTER DAM AT TOE OF SLOPE

(RFD1)



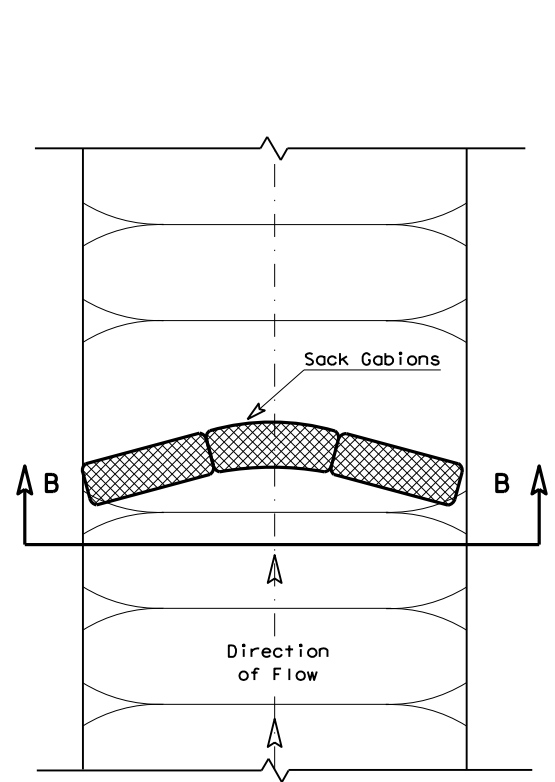
FILTER DAM AT SEDIMENT TRAP

(RFD1) OR (RFD2)

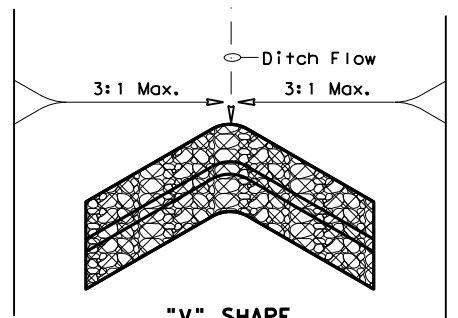


FILTER DAM AT CHANNEL SECTIONS

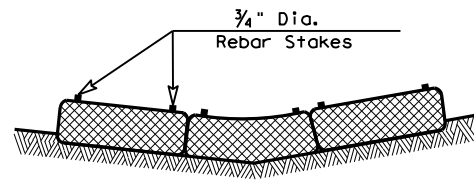
(RFD1) OR (RFD2) OR (RFD3)



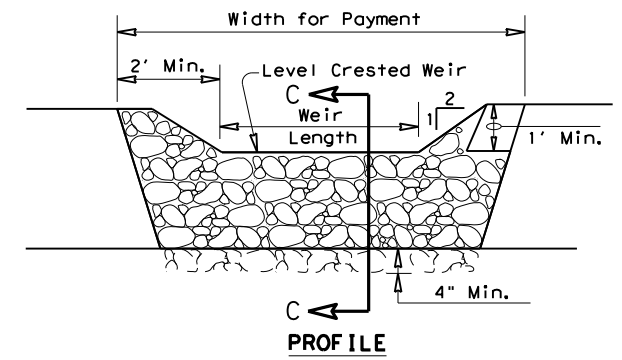
PLAN VIEW



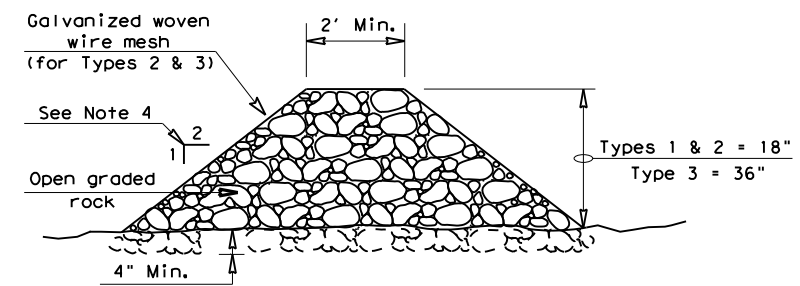
"V" SHAPE PLAN VIEW



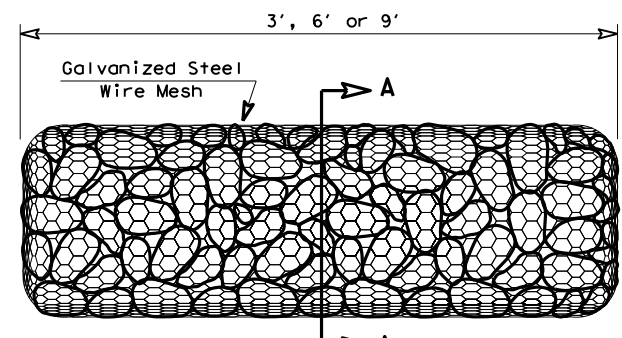
SECTION B-B



PROFILE

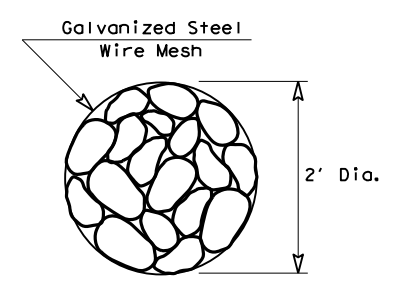


SECTION C-C



TYPE 4 (SACK GABIONS)

(RFD4)



SECTION A-A

ROCK FILTER DAM USAGE GUIDELINES

Rock Filter Dams should be constructed downstream from disturbed areas to intercept sediment from overland runoff and/or concentrated flow. The dams should be sized to filter a maximum flow through rate of 60 GPM/FT² of cross sectional area. A 2 year storm frequency may be used to calculate the flow rate.

Type 1 (18" high with no wire mesh) (3" to 6" aggregate): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity flows (approximately 8 Ft/Sec or more) in which aggregate wash out may occur. Sandbags may be used at the embedded foundation (4" deep min.) for better filtering efficiency of low flows if called for on the plans or directed by the Engineer.

Type 2 (18" high with wire mesh) (3" to 6" aggregate): Type 2 may be used in ditches and at dike or swale outlets.

Type 3 (36" high with wire mesh) (4" to 8" aggregate): Type 3 may be used in stream flow and should be secured to the stream bed.

Type 4 (Sack gabions) (3" to 6" aggregate): Type 4 May be used in ditches and smaller channels to form an erosion control dam.

Type 5: Provide rock filter dams as shown on plans.

GENERAL NOTES

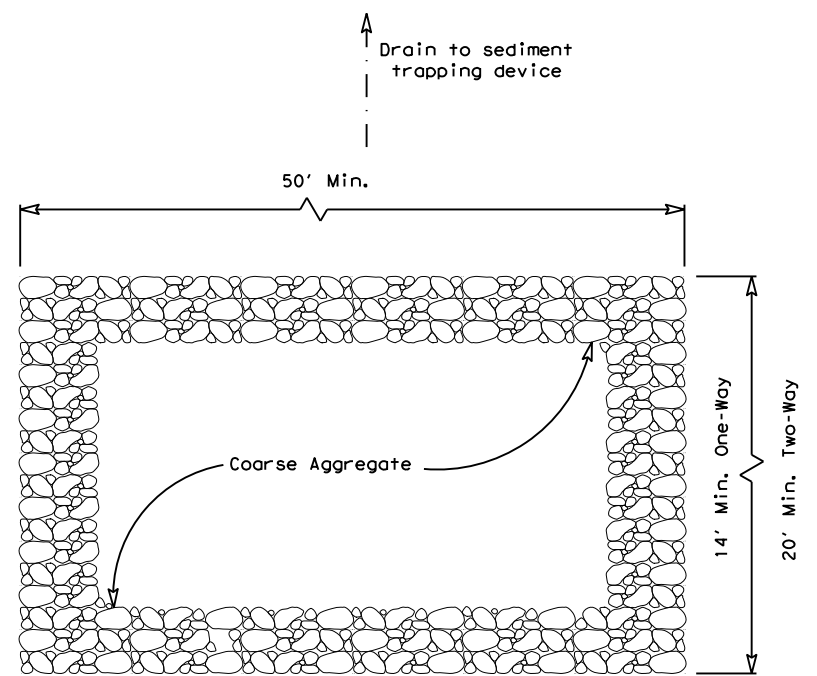
1. If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream at drainage structures, and in roadway ditches and channels to collect sediment.
2. Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by the specification for "Rock Filter Dams for Erosion and Sedimentation Control".
3. The rock filter dam dimensions shall be as indicated on the SW3P plans.
4. Side slopes should be 2:1 or flatter. Dams within the safety zone shall have sideslopes of 6:1 or flatter.
5. Maintain a minimum of 1' between top of rock filter dam weir and top of embankment for filter dams at sediment traps.
6. Filter dams should be embedded a minimum of 4" into existing ground.
7. The sediment trap for ponding of sediment laden runoff shall be of the dimensions shown on the plans.
8. Rock filter dam types 2 & 3 shall be secured with 20 gauge galvanized woven wire mesh with 1" diameter hexagonal openings. The aggregate shall be placed on the mesh to the height & slopes specified. The mesh shall be folded at the upstream side over the aggregate and tightly secured to itself on the downstream side using wire ties or hog rings. For in stream use, the mesh should be secured or staked to the stream bed prior to aggregate placement.
9. Sack Gabions should be staked down with 3/4" dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of 2 1/2" x 3 1/4".
10. Flow outlet should be onto a stabilized area (vegetation, rock, etc.).
11. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

PLAN SHEET LEGEND

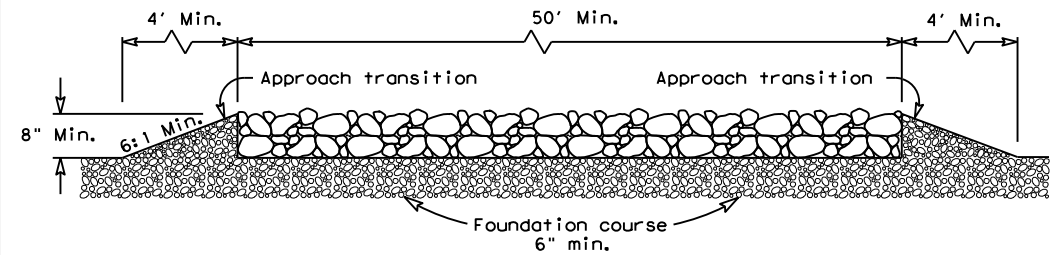
- Type 1 Rock Filter Dam (RFD1)
- Type 2 Rock Filter Dam (RFD2)
- Type 3 Rock Filter Dam (RFD3)
- Type 4 Rock Filter Dam (RFD4)

		Design Division Standard	
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES ROCK FILTER DAMS EC(2) - 16			
FILE: ec216	DN: TxDOT	CK: KM	DW: VP
© TxDOT: JULY 2016	CONT	SECT	JOB
REVISIONS	0205 02	067	US 79
DIST	COUNTY	SHEET NO.	
BRY	ROBERTSON	079	

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.
 FILE: \\txdot.projectwiseonline.com:TXDOT14\Documents\17 - BRY\Design Projects\0205020674 - Design\Plan Set\10 - Environmental\Standards\ec316.dgn
 DATE: 8/25/2021
 FILE: \\txdot.projectwiseonline.com:TXDOT14\Documents\17 - BRY\Design Projects\0205020674 - Design\Plan Set\10 - Environmental\Standards\ec316.dgn



PLAN VIEW

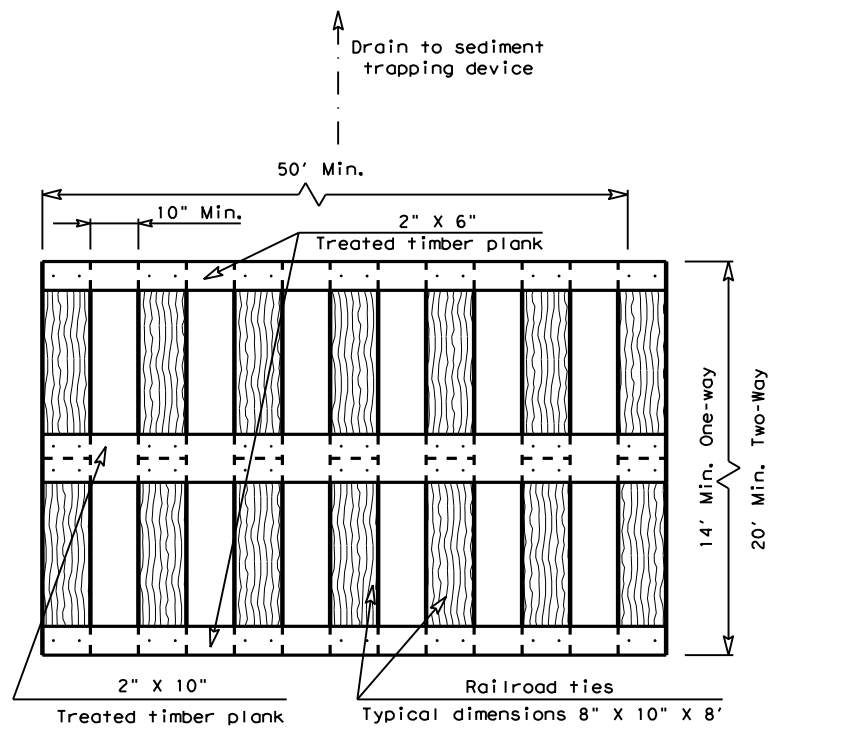


ELEVATION VIEW

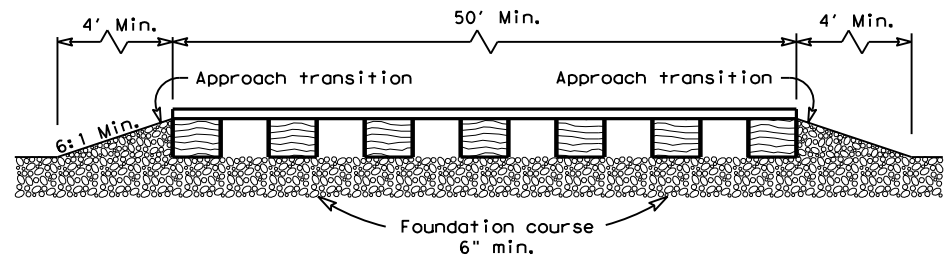
**CONSTRUCTION EXIT (TYPE 1)
ROCK CONSTRUCTION (LONG TERM)**

GENERAL NOTES (TYPE 1)

- The length of the type 1 construction exit shall be as indicated on the plans, but not less than 50'.
- The coarse aggregate should be open graded with a size of 4" to 8".
- The approach transitions should be no steeper than 6:1 and constructed as directed by the Engineer.
- The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other materials approved by the Engineer.
- The construction exit shall be graded to allow drainage to a sediment trapping device.
- The guidelines shown hereon are suggestions only and may be modified by the Engineer.
- Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.



PLAN VIEW

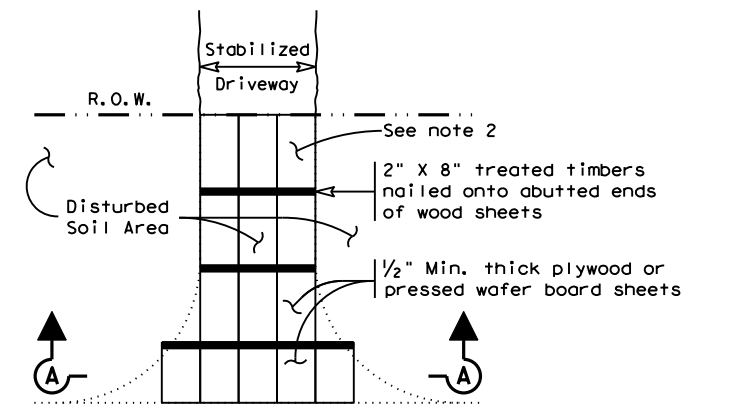


ELEVATION VIEW

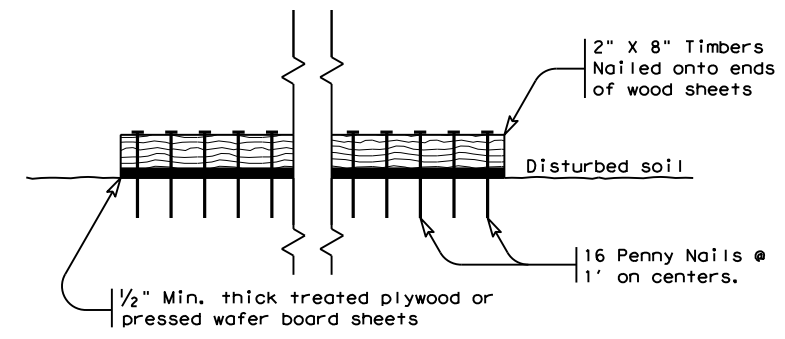
**CONSTRUCTION EXIT (TYPE 2)
TIMBER CONSTRUCTION (LONG TERM)**

GENERAL NOTES (TYPE 2)

- The length of the type 2 construction exit shall be as indicated on the plans, but not less than 50'.
- The treated timber planks shall be attached to the railroad ties with 1/2" x 6" min. lag bolts. Other fasteners may be used as approved by the Engineer.
- The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
- The approach transitions shall be no steeper than 6:1 and constructed as directed by the Engineer.
- The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other material as approved by the Engineer.
- The construction exit should be graded to allow drainage to a sediment trapping device.
- The guidelines shown hereon are suggestions only and may be modified by the Engineer.
- Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.



PLAN VIEW



**SECTION A-A
CONSTRUCTION EXIT (TYPE 3)
SHORT TERM**

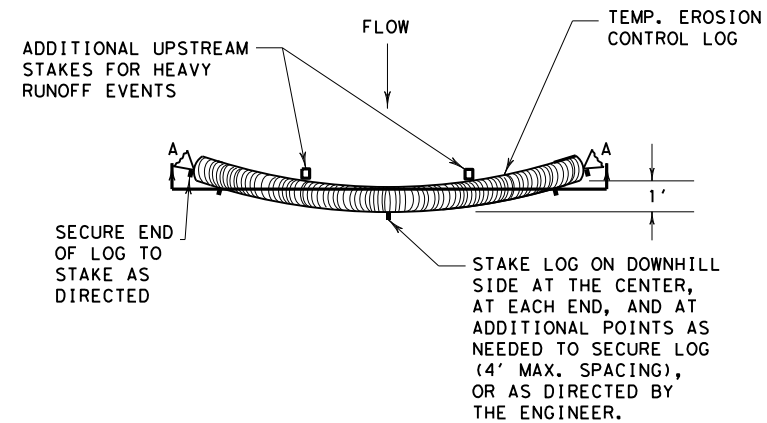
GENERAL NOTES (TYPE 3)

- The length of the type 3 construction exit shall be as shown on the plans, or as directed by the Engineer.
- The type 3 construction exit may be constructed from open graded crushed stone with a size of two to four inches spread a min. of 4" thick to the limits shown on the plans.
- The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
- The guidelines shown hereon are suggestions only and may be modified by the Engineer.

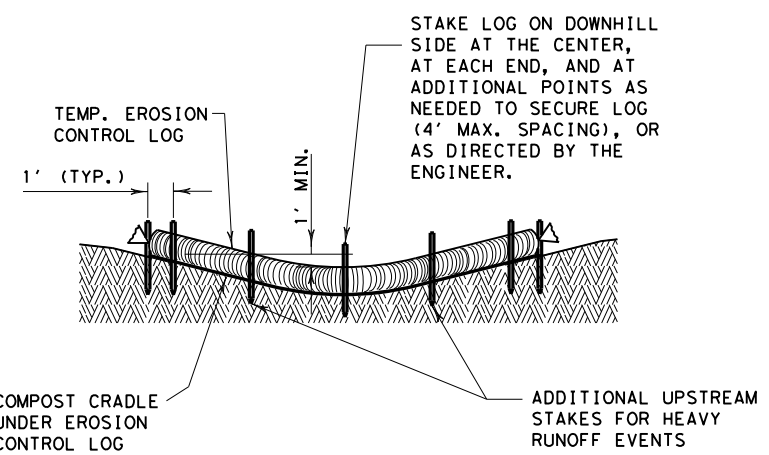
		Design Division Standard	
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES CONSTRUCTION EXITS EC(3)-16			
FILE: ec316	DN: TxDOT	CK: KM	DW: VP
© TxDOT: JULY 2016	CONT: 0205	SECT: 02	JOB: 067
REVISIONS			HIGHWAY: US 79
DIST: BRY	COUNTY: ROBERTSON	SHEET NO. 080	

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 8/25/2021
 FILE: pw:\t\tdot\projectwiseonline.com\TXDOT4\Documents\17 - BRY\Design Projects\020502067\4 - Design\Plan Set\10. EnvironmentalStandards\ec916.dgn

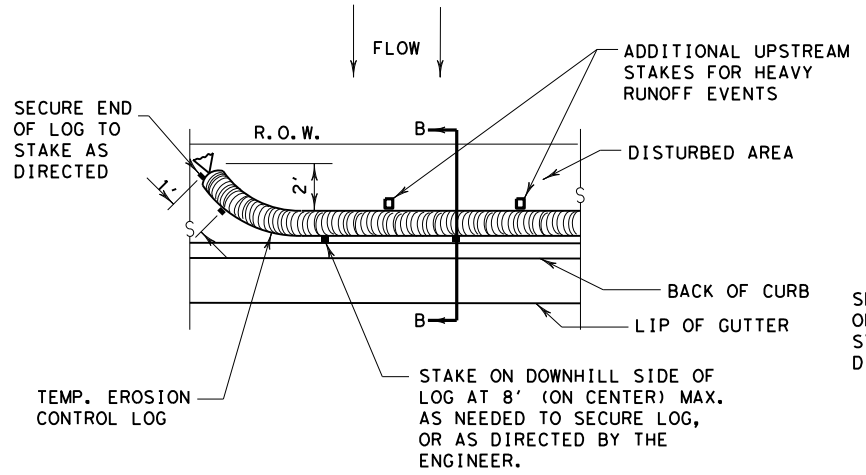


PLAN VIEW

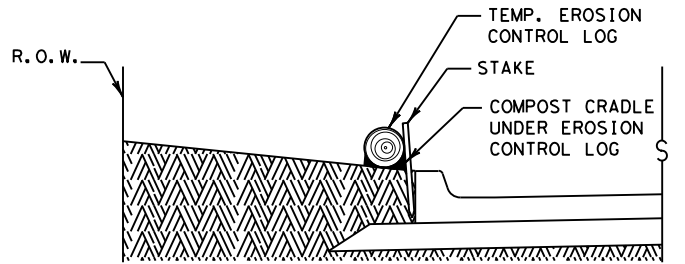


SECTION A-A
EROSION CONTROL LOG DAM

CL-D

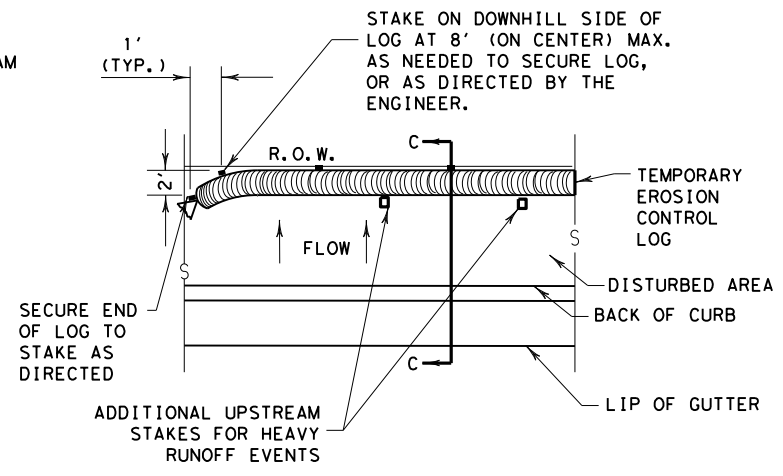


PLAN VIEW

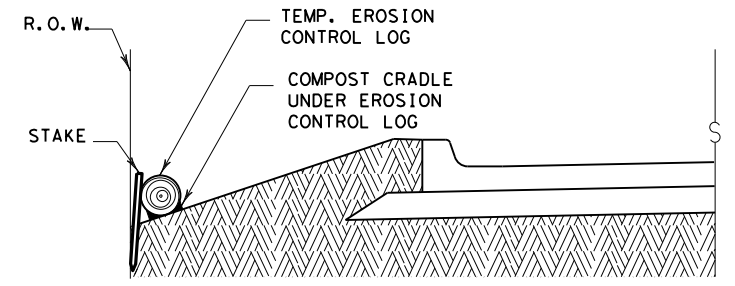


SECTION B-B
EROSION CONTROL LOG AT BACK OF CURB

CL-BOC



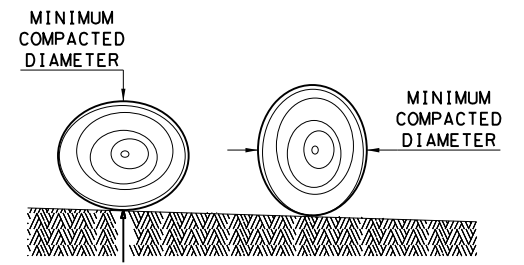
PLAN VIEW



SECTION C-C

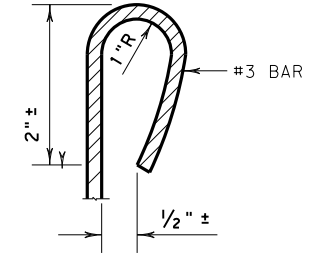
EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

- LEGEND**
- CL-D EROSION CONTROL LOG DAM
 - CL-BOC EROSION CONTROL LOG AT BACK OF CURB
 - CL-ROW EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY
 - CL-SST EROSION CONTROL LOGS ON SLOPES STAKE AND TRENCHING ANCHORING
 - CL-SSL EROSION CONTROL LOGS ON SLOPES STAKE AND LASHING ANCHORING
 - CL-DI EROSION CONTROL LOG AT DROP INLET
 - CL-CI EROSION CONTROL LOG AT CURB INLET
 - CL-GI EROSION CONTROL LOG AT CURB & GRATE INLET



REBAR STAKE DETAIL

SEDIMENT BASIN & TRAP USAGE GUIDELINES

An erosion control log sediment trap may be used to filter sediment out of runoff draining from an unstabilized area.

Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

Control logs should be placed in the following locations:

1. Within drainage ditches spaced as needed or min. 500' on center
2. Immediately preceding ditch inlets or drain inlets
3. Just before the drainage enters a water course
4. Just before the drainage leaves the right of way
5. Just before the drainage leaves the construction limits where drainage flows away from the project.

The logs should be cleaned when the sediment has accumulated to a depth of 1/2 the log diameter.

Cleaning and removal of accumulated sediment deposits is incidental and will not be paid for separately.

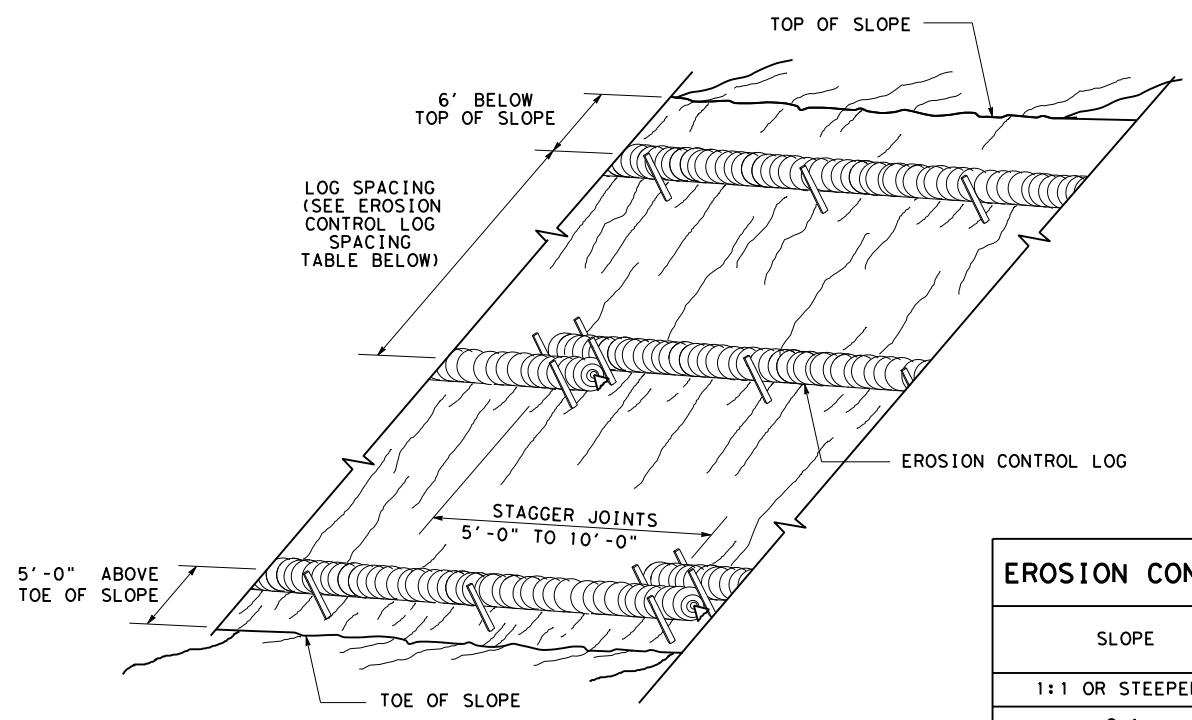
GENERAL NOTES:

1. EROSION CONTROL LOGS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, OR AS DIRECTED BY THE ENGINEER.
2. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED.
3. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH ONLY WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. FOR TEMPORARY INSTALLATIONS, USE RECYCLABLE CONTAINMENT MESH.
4. FILL LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE THE MINIMUM COMPACTED DIAMETER SPECIFIED IN THE PLANS WITHOUT EXCESSIVE DEFORMATION.
5. STAKES SHALL BE 2" X 2" WOOD OR #3 REBAR, 2'-4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG, OR AS DIRECTED BY THE ENGINEER.
6. DO NOT PLACE STAKES THROUGH CONTAINMENT MESH.
7. COMPOST CRADLE MATERIAL IS INCIDENTAL & WILL NOT BE PAID FOR SEPARATELY.
8. SANDBAGS USED AS ANCHORS SHALL BE PLACED ON TOP OF LOGS & SHALL BE OF SUFFICIENT SIZE TO HOLD LOGS IN PLACE.
9. TURN THE ENDS OF EACH ROW OF LOGS UPSLOPE TO PREVENT RUNOFF FROM FLOWING AROUND THE LOG.
10. FOR HEAVY RUNOFF EVENTS, ADDITIONAL UPSTREAM STAKES MAY BE NECESSARY TO KEEP LOG FROM FOLDING IN ON ITSELF.

SHEET 1 OF 3

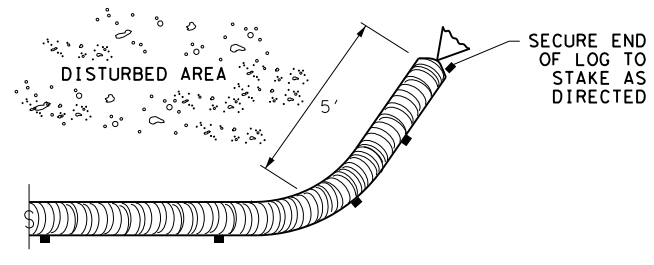
		Design Division Standard	
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES EROSION CONTROL LOG EC (9) - 16			
FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT
© TxDOT: JULY 2016	CONT	SECT	JOB
REVISIONS	0205	02	067
DIST	COUNTY	SHEET NO.	
BRY	ROBERTSON	081	

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.
 DATE: 8/25/2021
 FILE: p:\txdot\projectwiseonline.com\TXDOT4\Documents\17 - BRY\Design Projects\020502067\4 - Design\Plan Set\10. EnvironmentalStandards\ec916.dgn



**EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING**

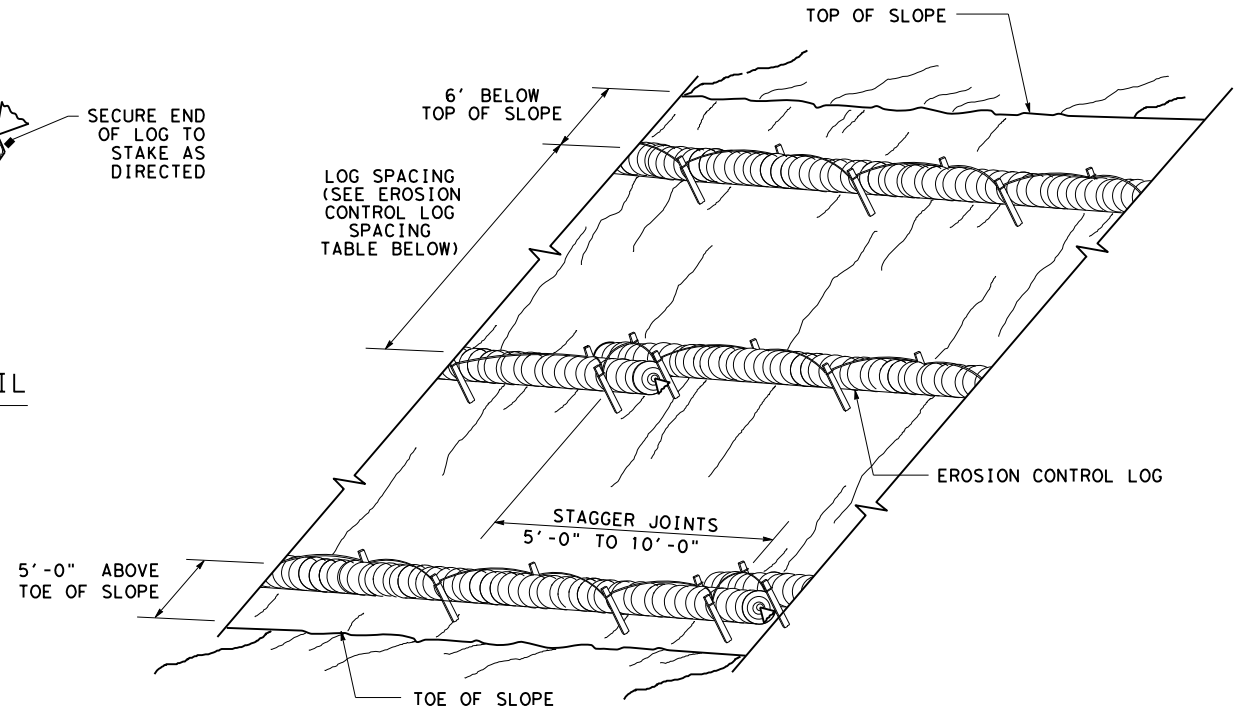
CL-SST



END SECTION RAP DETAIL

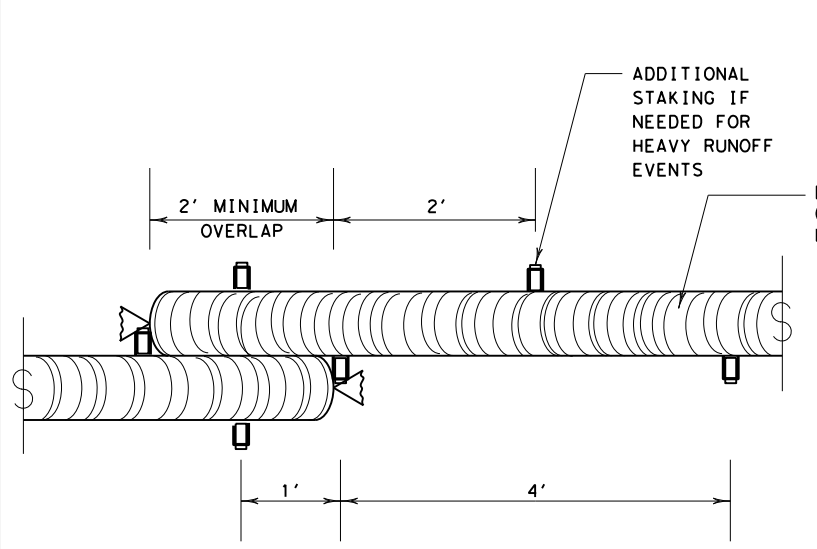
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
 SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
 HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



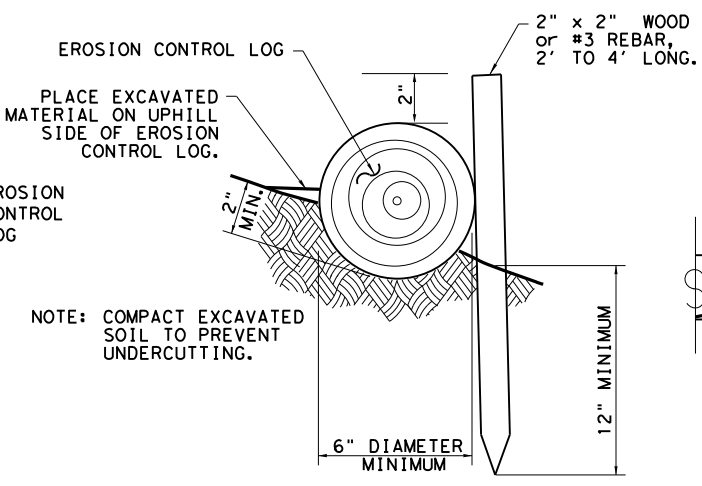
**EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING**

CL-SSL



STAKE AND TRENCHING ANCHORING DETAIL

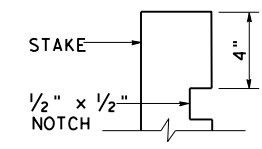
CL-SST



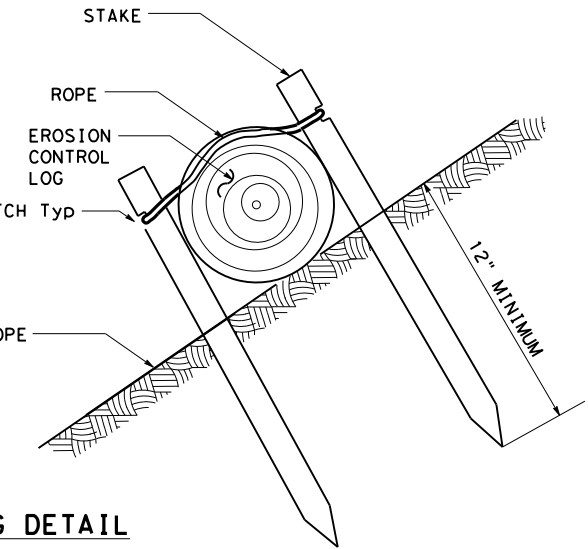
STAKE AND LASHING ANCHORING DETAIL

CL-SSL

LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"



STAKE NOTCH DETAIL

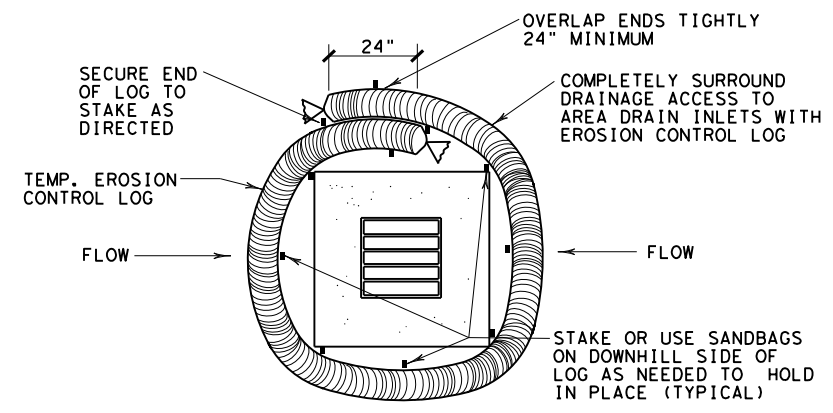


SHEET 2 OF 3

		Design Division Standard	
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES EROSION CONTROL LOG EC (9) - 16			
FILE: ec116	DN: TxDOT	CK: KM	DW: LS/PT
© TxDOT: JULY 2016	CONT SECT	JOB	HIGHWAY
REVISIONS	0205 02	067	US 79
DIST	COUNTY	SHEET NO.	
BRY	ROBERTSON	082	

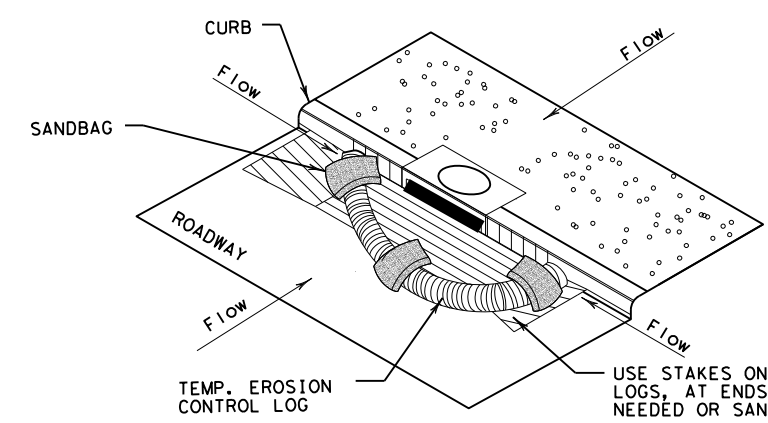
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE: 8/25/2021
 FILE: \\txdot\projectwise\online.com\TXDOT4\Documents\17 - BRY\Design Projects\020502067\4 - Design\Plan Set\10. EnvironmentalStandards\ec916.dgn



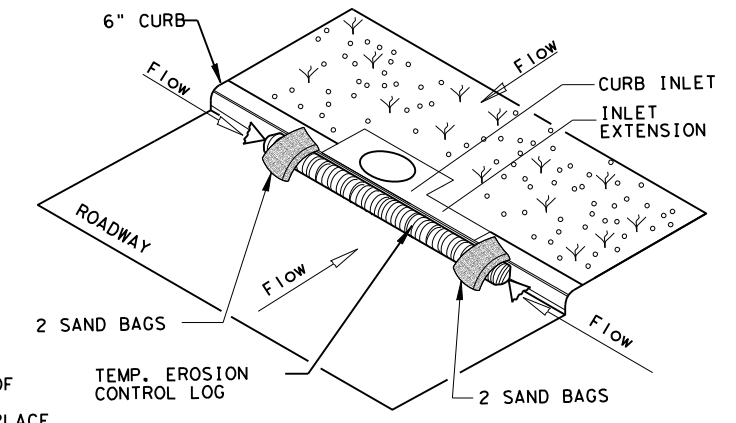
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

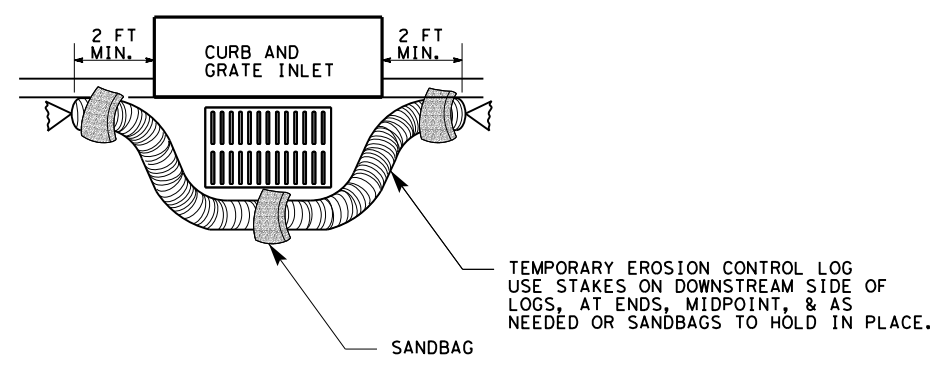
CL-CI



EROSION CONTROL LOG AT CURB INLET

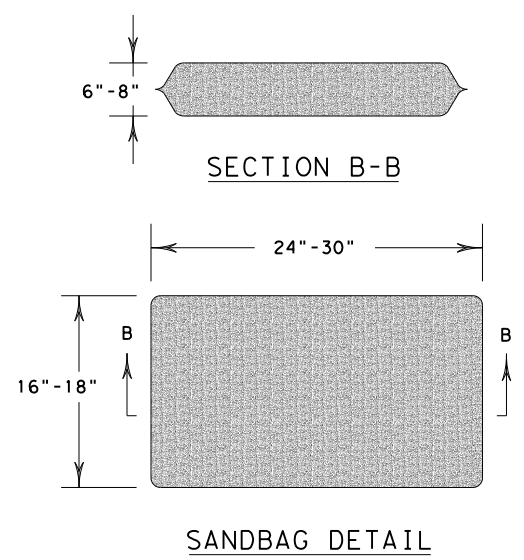
CL-CI

NOTE:
 EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI



SHEET 3 OF 3

		<i>Design Division Standard</i>	
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES EROSION CONTROL LOG EC (9) - 16			
FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT
© TxDOT: JULY 2016	CONT: 0205	SECT: 02	JOB: 067
REVISIONS	DIST: BRY		COUNTY: ROBERTSON
			SHEET NO.: 083